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Students' gratitude and engagement in online learning: An experimental study

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Abstract

Engagement is essential in education, particularly in online learning. Many studies have been done to determine various antecedents of student engagement. However, more evidence-based experimental research is still needed to improve student engagement during online learning. This study aims to examine the effect of a gratitude intervention on student engagement in online learning. This study uses an experimental research design with a pre-and post-test control group design. Two online questionnaires were used in this study, a gratitude adjective checklist (GAC) and an online student engagement scale (OSES) which were administered to 47 undergraduate students. The participants were classified randomly into three conditions. In the first group, 20 students had a general gratitude exercise (experimental Group 1). In the second group, 15 students had an Islamic gratitude task (experimental Group 2). The last group consisted of 12 students without any gratitude tasks as a control group. The data were analyzed with Anova repeated measurements based on the pre- and post-test control group design. Results showed no interaction between different types of treatment and increased online engagement. However, it was found that the general gratitude treatment had the most significant effects compared to other treatments. This research proves that students can increase student engagement through the habit of being grateful daily including by writing down what things make them grateful.

Keywords: Engagement, Experiment, Gratitude, Islamic gratitude, Online learning, Undergraduate students.

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Transparency: The authors confirm that the manuscript is an honest, accurate, and transparent account of the study; that no vital features of the study have been omitted; and that any discrepancies from the study as planned have been explained. This study followed all ethical practices during writing.

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1. Introduction

The COVID-19 pandemic brings many changes to human life. There are many adjustments that humans need to make in all aspects. This adjustment is also made in the teaching and learning process. Previously, the learning process was offline since this pandemic almost became online. This change in learning certainly provides extraordinary challenges for all fields without exception.

The online learning process in Indonesia has generally been going on for 1.5 years. The quality and expectations of the completed online learning remain unfulfilled despite the prolonged time. Many obstacles and problems were found in the field related to this online learning process. The challenges that lecturers commonly face in online learning are how the learning methods should be carried out and the use of learning media that supports online learning based on the author's observations and experiences. In several lecturer forums attended by the author, a few lecturers were still not used to using platforms (which varied) for online learning. Lecturers still feel confused about the learning methods that must be applied in online learning situations especially to build student involvement and active participation in online learning.

The challenges of online learning are certainly not only felt by lecturers. Online learning presents challenges for students who are the main actors in this online learning process. Several challenges are felt and experienced by students based on the author's observations and surveys in the classes that the author teaches. These challenges include the area (location) of student learning (internet network difficulties or disturbances), learning facilities (and media) owned by students (including internet quota, use of devices and reference sources), "interference" during studying at home (being asked for help from parents, family, taking care of younger siblings and others), interpersonal relationships (including working on group assignments, interactions with peers and others) and challenges from the students themselves (psychological problems).

The online learning evaluation results at the Islamic University of Indonesia show that online learning which has been going on for a year and a half presents several obstacles. The survey shows that implementing online lectures is difficult for both lecturers and students. 65% of students feel that implementing online lectures is complex and 40% feel the same way based on a survey conducted on 17,867 students and 667 lecturers at the campus where the author teaches. It is coupled with the fact that 51% of lecturers feel that preparation for implementing online lectures is complex. 48% of students and 36% of lecturers still feel dissatisfied with implementing online lectures [1].

Dissatisfaction and heaviness during the learning process indicate that people are disengaged. According to [Connell and Wellborn \[2\]](#) various behaviors are shown by students who are not interested in being involved in the processes at school such as low academic achievement, decreased learning motivation, low levels of happiness, high dissatisfaction and boredom about school. In learning, engagement can also be understood as the involvement of individuals with relevant phenomena and plays a role in individual learning [3]. Engagement relates to the nature of an individual's involvement with activities and conditions that may result in learning [Coates \[3\]](#). [Dixson \[4\]](#) suggests that student engagement is the extent to which individuals are actively involved by thinking, speaking and interacting with course content or learning with other students in the course.

Student engagement is a multi-dimensional construct. On the behavioral dimension, engagement includes positive behavior related to school, learning, attendance and participation in school-related activities. Meanwhile, emotional or affective dimensions include positive or negative responses and feelings towards class and school, teachers, peers and a sense of belonging or connectedness to the school. The cognitive dimension of engagement includes the perceived relevance of school work, the use of immersive strategies and the deployment of cognitive strategies necessary for understanding complex ideas [5]. Student engagement has a connection to every aspect of student life (home, school, peers and community) [6]. A high level of engagement will be able to lead to increased positive academic outcomes, life skills, competencies and values. Therefore, engagement supports adolescents as they transition into adulthood [Fredricks, et al. \[7\]](#). [Dixson \[4\]](#) also suggests that student engagement is vital in keeping students connected to the course and learning.

[Connell and Wellborn \[2\]](#) explain that engaged students show engaged behavior in learning, have positive emotions and tend to survive in the face of challenges. Several studies have also shown that individuals who engage in learning and school activities show better academic achievement [8-11]. In addition to academic achievements and accomplishments, the study by [Fredricks, et al. \[5\]](#) explains that student engagement is correlated with many variables: the level of completion of studies or school, academic aspirations, adjustment, mental health and life satisfaction which can be an individual protective factor from risky behavior and other behavioral problems.

The importance of increasing individual engagement in the learning process is undoubtedly recognized by many fields not only in the learning process which is now still dominantly held in the form of online or hybrid learning. [Dixson \[4\]](#) states that student engagement is crucial to individual learning especially in online learning environments where individuals often feel isolated and disconnected. [Dixson \[12\]](#) also adds that one of the significant components of online learning is student engagement. Therefore, it is crucial to learn what makes students more engaged in online learning especially if you want to offer an effective online learning environment.

Increasing individual engagement and active participation in online learning is challenging including for students. A study by [Fredricks, et al. \[5\]](#) concludes that various interventions are needed to increase student engagement depending on each aspect of engagement. On the behavioral dimension, academic support student participation in classroom and school-based activities. Another intervention such as mentoring, peer-based learning and extracurricular activities increases emotional and affective engagement that strengthens student relationships with peers and strengthens bonds with schools [5]. Several interventions such as goal setting, promotion of growth mindsets and project-based learning were effective in increasing cognitive aspects of engagement [5].

Previous studies show that many interventions have been given to increase student engagement and their impact has been investigated. However, the authors have not found many interventions that focus on individual traits and their effect on engagement in learning, including gratitude. [McCullough, et al. \[13\]](#) state that gratitude is included in the affective trait, mood or emotion referred to as a grateful disposition or disposition towards gratitude which is defined as a general tendency to recognize and respond with grateful emotions to the role of virtue in a person's positive experiences and outcomes.

In a meta-analysis study by [Davis, et al. \[14\]](#) gratitude has been widely studied for its relationship and impact on several variables. However, most of the impacts or outcomes measured focused on psychological well-being such as life satisfaction, patient health, marital satisfaction, life goals and feelings about life. Moreover, previous studies examined the relationship of gratitude to learning variables such as resilience in learning [\[15\]](#), motivation [\[16\]](#) and academic engagement [\[16-18\]](#). However, fewer variables were previously discovered by the authors.

Few studies that show how gratitude is associated with student engagement. Therefore, it is interesting to study further how gratitude affects individual engagement especially for students in the context of online learning nowadays. This study aims to examine the effect of a gratitude intervention on student engagement in online learning. The effectiveness of this intervention will be an alternative approach to improve engagement and high engagement may increase students' well-being, learning and achievement [\[16\]](#).

1.1. Rationale of the Study

Previous studies have shown that a gratitude intervention could foster student engagement. King and Datu's experimental study [\[16\]](#) demonstrated that gratitude may lead students to a higher level of motivation and engagement. In the online treatment program such interventions also promise a beneficial effect on student engagement [\[19\]](#).

There are still few studies that have explored the effect of gratitude interventions on student engagement. Dicken's meta-analysis found no such topic on engagement [\[20\]](#). A few studies have taken experimental studies to engagement [\[16, 21\]](#) but more limited investigations have investigated how gratitude interventions affect online student engagement.

Previous research relies on western contexts often called WEIRD (Western, Educated, Industrialized, Rich and Democratic). A meta-analysis by Dickens has shown that gratitude intervention studies are dominant within western societies [\[20\]](#). Representation studies from non-western regions such as Asia were still under research. Recent research on gratitude interventions suggests they are more culturally sensitive [\[22\]](#). It is imperative to acknowledge and integrate cultural backgrounds into this study. We need to take into account the Islamic value of gratitude as our population in Indonesia is predominantly Muslim.

2. Literature Review

Several studies use the term engagement to describe the extent to which students identify and appreciate school results and student participation in academic and non-academic activities [\[23\]](#). Engagement is more than just physical student participation. According to [Harper and Quayle \[24\]](#) and [Zhang, et al. \[25\]](#), it involves feelings and sense-making. Student engagement in several studies has the assumption that learning is how students develop or construct their knowledge [\[3\]](#).

According to [Dixson \[4\]](#), what is meant by student engagement is that students devote time, energy, thoughts, effort and feelings to learning. OSE aims to improve what students do actively and reflectively as well as how students feel about the learning they do as well as the interactions that occur between students, teachers and other students in terms of skills, participation, performance and emotions [\[4\]](#) by adhering to Dixson's definition. Student engagement is defined as the level of attention, curiosity, interest, optimism and enthusiasm that students show when they learn or are taught in class which includes the level of motivation they have to learn and progress in their education [\[26\]](#).

[Fredricks, et al. \[27\]](#) and [Zhang, et al. \[25\]](#) explain that there are three aspects of student engagement which include

- a. Behavioral engagement which is based on the concept of participation includes involvement in academic, social or extracurricular activities and is considered important for obtaining good academic performance and avoiding dropping out of school. Behavioral engagement refers to the idea of participation and includes involvement in academic, social or extracurricular activities. Behavioral engagement is about student compliance and attendance which may vary from class to class and a teacher needs to consider the culture and pedagogy of the students in the class [\[26\]](#). In practice, this aspect can be implied by how students devote energy and time to actively participating in groups, doing well on exams and getting good grades [\[4, 28\]](#).
- b. Emotional engagement is thought to develop ties to an institution and influence the willingness to carry out work by including affective reactions (both positive and negative) to the surrounding environment such as curiosity, boredom, excitement and anxiety. When students are emotionally engaged, it includes how lectures become more interesting and how they apply it in their lives [\[4, 28\]](#). Emotional engagement focuses on the extent of positive (and negative) reactions towards teachers, classmates, academics and school. Emotional engagement is a person's response to learning and desire to pursue an action or idea [\[26\]](#).
- c. Cognitive engagement is built on two concepts: investment and strategic learning. Cognitive engagement is a student's level of investment in learning which includes being thoughtful and purposeful in approaching school assignments and being willing to exert the effort necessary to understand complex ideas or master difficult skills [\[26\]](#). Cognitively engaged students may be intrinsically motivated, willing to exceed requirements, prefer challenges and be resilient. They may strategically manage and control their efforts on tasks such as suppressing distractions or organizing their learning. They may invest psychologically and strategically in learning

simultaneously. When students continue to read and exert effort in their studies, it can show their cognitive engagement [4, 28].

Student engagement plays a pivotal role in education outcomes as it can elevate performance, enhance social competence, decrease health risk behaviors, prevent truant behavior and reduce delinquency [29]. Accordingly, cultivating engagement is a crucial factor contributing to students' academic success. It involves the active investment of various physical and psychological energies by students encompassing both academic and extracurricular pursuits. Students actively seek opportunities both inside and outside the classroom that foster successful learning experiences [30].

Many variables can influence student engagement, including learning methods like the contextual teaching-learning method [31] and the numbered heads together method [32] contextual factors like parental involvement, peer attachment, teacher support [30], family functioning and peer support [29] some motivational factors like academic self-efficacy [30] and value, interest, competence and mastery goals [7]. In Wallace and Chhuon [33] and Fredricks, et al.'s [7] study, it was stated that students felt more engaged when their teachers listened to them, gave them a voice and took their views seriously. Fredricks, et al. [7] stated that engagement was higher when students felt competent and thought that the subjects they learned would be useful in their future. Connell and Wellborn [2] and Qudsyi, et al.'s [30] study showed that students who engage in school will show behavioral involvement in learning and have a positive emotional attitude they endure in the face of challenges. It means that by increasing emotional competencies, students can increase student engagement [30].

One factor that is important in increasing student engagement is the emotional competence of students. On the other hand, little is understood about how general emotions affect student engagement [18]. According to a study by Reschly, et al. [34] and Zhen, et al. [18] students may be more likely to participate in academic activities if they experience positive emotions regularly. Frequent positive emotions during school were associated with higher levels of student engagement and vice versa. In this sense, one of the positive emotions that could be a significant precursor to academic (student) engagement is gratitude [18].

Although most people grasp what gratitude is intuitively. It can be surprisingly hard to articulate. Is it feeling something? A good thing? An action? Various people will indeed interpret gratitude differently depending on the situation. Scholars have created a few conceptual frameworks to enable scientific research on gratitude [35]. Like other emotions, gratitude may manifest as an emotion, a mood or an affective feature [13]. The definition of gratitude is the respect or affection one feels for things (animate or inanimate) that are not oneself but instead provide happiness or benefit [36]. Gratitude is an emotion, the core of which is a pleasant feeling about the benefit received [37]. The idea of undeserved merit is fundamental to gratitude. The grateful individual understands that the gift or benefit was given freely and that he or she did nothing to earn it [37]. Gratitude is an interpersonal communication between humans and other deliberate non-human entities that makes the recipient feel good [38].

The feeling of gratitude arises when one is helped by someone else and believes that assistance is expensive, worthwhile and selfless [39]. When a person (beneficiary) believes that someone else (benefactor) or source (such as God, fate or luck) has taken conscious steps to enhance the beneficiary's well-being, gratitude is felt [40]. It seems that the mental-action tendency that gratitude initiates is the desire to act prosocial towards oneself, others, or both (i.e., gratitude serves as a moral incentive) based on the evaluations by McCullough, et al. [13]. Fredrickson conceptualized that this thought-action tendency is expanded rather than contracted as it doesn't seem to lead appreciative people to give back to their benefactor in kind merely or to replicate and return the identical prosocial deed that the donor performed. Therefore, it seems that being grateful causes people to creatively consider a wide range of acts that might help others, thereby broadening their modes of thought [40].

3. Materials and Methods

This study uses an experimental research design with a pre –and post-test control group design. In this study, the differences in measurement results before and after the intervention were given between the experimental and control groups. This study examines the effect of a gratitude intervention on student engagement in different groups. In this case, this study will compare the engagement scores obtained by participants in experimental group 1 (EG1), experimental group 2 (EG2) and the control group (CG), before and after the intervention.

The intervention that will be given in the study is modified from research that has been carried out by Enmons and McCullough [41], Sheldon and Lyubomirsky [42] and Al-Seheel's [43] modification of several parts of the gratitude intervention by Wilson [15] and King and Datu [16]. The interventions given to each group are as follows:

- a. Experimental Group 1 (EG1): General gratitude exercise where participants were asked to write down things that made them grateful in a general context (western-based gratitude exercise).
- b. Experimental Group 2 (EG2): Islamic-based gratitude exercise where participants were asked to write down things that made them grateful for Allah's power (Islamic-based gratitude exercise).
- c. Control Group (CG): Daily condition exercise where participants are asked to write down things related to their daily experiences and conditions (life details exercise).

The data collection in this study used an adaptation of the Online Student Engagement Scale (OSES) measuring instrument developed by Dixon [4] and Dixon [12] which consists of 19 items and is divided into four aspects: aspects of skills (6 items), emotional (5 items), participation (6 items) and performance (2 items). The original measuring instrument has a Cronbach alpha reliability coefficient of 0.91. In addition, student engagement in this study will also be seen through the level of student participation or lecture attendance which will be asked using self-reports.

This study will also measure the level of participants' gratitude and manipulation check (intervention). The measurement of gratitude in this study will use an adaptation of the Gratitude Adjective Checklist (GAC) measuring instrument developed by Mccullough, et al. [13] which consists of 3 items: grateful, thankful and appreciative.

The implementation procedure in this research is generally described as follows:

- a. Researchers prepare complete research documents (measurements, intervention documents and informed consent).
- b. Submission of research approval to the ethics committee.
- c. Collecting data for the process of finding students (screening) willing to become research participants is used as pre-test (OSES) data.
- d. The process of obtaining the informed consent of research participants.
- e. Technical briefing of research implementation by researchers to participants.
- f. Induction of gratitude and instruction of gratitude intervention to participants by a facilitator.
- g. The gratitude intervention was carried out for two weeks where in a week, there would be an intervention process three times.
- h. Participants will be asked to write down things that make them grateful every two days for two weeks (EG1 and EG2) and write random things unrelated to gratitude (CG).
- i. The research assistant reminded participants in each study group (EG1, EG2, CG) to carry out assignments according to the intervention in each group every two days for two weeks.
- j. At the end of the intervention (the end of the second week), participants were asked to provide insight by answering open questions provided by the researcher.
- k. At the end of the intervention session, the researcher or facilitator will review the overall activities that the participants have carried out.
- l. Participants were asked to collect all the results of the assignments in the research process at the end of the intervention session.
- m. The researcher asked the participants to complete the OSES and GAC fields as post-test data.

In a nutshell, the implementation of this research can be seen in [Table 1](#).

Table 1.
Research implementation.

Date	Session	Activity
10-Dec-21	1	The opening of the orientation program
	2	Intervention induction
	3	The explanation of exercises and worksheets
10-Dec-21	4	Worksheet collection reminder (Group chat) Worksheets are collected at 23.59 Jakarta time.
12-Dec-21	5	
14-Dec-21	6	
16-Dec-21	7	
18-Dec-21	8	
20-Dec-21	9	
21-Dec-21	10	
28-Dec-21	11	Follow up (Group chat)

Table 2.
Description of the gratitude scores between groups.

Statistic	Pre			Post		
	General gratitude	Islamic gratitude	Control group	General gratitude	Islamic gratitude	Control group
Valid	20	15	12	20	15	12
Missing	0	0	0	0	0	0
Mean	13.40	13.20	13.50	14.60	14.47	14.25
SD	1.88	2.27	1.93	0.82	0.92	1.86
Min.	9.00	8.00	9	12.00	12	9
Max.	15.00	15.00	15.00	15.00	15	15.00

Note: SD = Standard deviation, Min. = Minimum, Max. = Maximum.

4. Results

4.1. Description of the Research Subject

[Table 2](#) shows the results of different writing interventions for gratitude scores. Across all the groups, the mean score has increased. The general gratitude group mean improved from 13.40 (SD=1.88) to 14.60 (SD=0.82). The Islamic gratitude mean score increased from 13.20 (SD=2.27) to 14.47 (SD=0.92). The control group's gratitude (without gratitude) also increased from 13.50 (SD=1.93) to 14.25 (SD=1.86). A within-subject analysis pointed out a significant increase in gratitude scores over time within each group ($F(1, 44)=14.37, p<0.001$). However, no significant differences were found between the groups ($F(2, 44)=0.29, p=0.75$) based on the interaction between time and group.

Table 3.
Description of online student engagement (OSE) scores between groups.

Statistic	Pre-test			Post-test		
	General gratitude	Islamic gratitude	Control group	General gratitude	Islamic gratitude	Control group
Valid	20	15	12	20	15	12
Missing	0	0	0	0	0	0
Mean	69.00	72.87	71.75	78.45	78.13	77.08
SD	9.22	12.36	12.12	7.24	8.76	10.77
Min.	47.00	47.00	53.00	66.00	60.00	56.00
Max.	88.00	95.00	95.00	90.00	91.00	93.00

Note: SD = Standard deviation, Min. = Minimum, Max. = Maximum.

Table 3 shows the different writing interventions for online student engagement (OSE) scores. The OSE mean score improves across the groups like the gratitude enhancement. The general gratitude group mean improved from 69.00 (SD=9.22) to 78.45 (SD=7.24). The Islamic gratitude mean score increased from 72.87 (SD=12.36) to 78.13 (SD=8.76). The control group’s gratitude increased from 71.75 (SD=12.12) to 77.08 (SD=10.77). A within-subject analysis indicated a significant increase in OSE scores over time within each group ($F(1, 44)=32.15, p<0.001$). However, no significant differences were found between the groups ($F(2, 44)=1.59, p=0.22$) based on the interaction between time and group.

4.2. Interaction between Group and Treatment

Repeated measure analysis determines whether each group has different changes [44]. The assumption of similarity of variance (homogeneity) between groups must be met to perform repeated measure analysis so that the results are free from baseline bias [44]. The following are the results of the homogeneity test (equality test).

Table 4.
Homogeneity test of gratitude score.

Test	Value
Box's M	7.245
F	1.123
df1	6
df2	20647.781
Sig.	0.346

The results from Table 4 show that none of the data between groups shows a significant difference in variance ($p=0.346$). Therefore, the three groups have homogeneous data variance in both pre- and post-test measurements. Thus, multivariate results can determine whether there is an interaction between the three groups [45].

Table 5.
Tests of within-subjects effects.

Cases	Sphericity correction	Sum of squares	df	Mean square	F	p	η^2_p
RM factor 1	Greenhouse-geisser	1005.0	1.00	1005.0	32.15	< 0.001	0.422
RM factor 1 * group	Greenhouse-geisser	99.1	2.00	49.6	1.59	0.216	0.067

Note: Type 3 sums of squares.

Table 5 shows that the main effect is significant with $F=1, 32.15, p < 0.001, \eta^2_p = 0.42$. This indicates that the change over time significantly affects online student engagement. However, there is no interaction between the change over time and the groups where $F=2, 1.59, p = 0.216, \eta^2_p = 0.067$. Thus, there is no significant difference in online student engagement between the groups treated with general gratitude, Islamic gratitude or placebo. The pattern of online student engagement from all groups can be seen in the plot below.

Figure 1 suggests that online student engagement scores in the three groups have increased. Visually, the group given the general gratitude treatment experienced the sharpest increase because it had the lowest baseline (pre-test) and then experienced the highest increase in the post-test. The post-hoc in Table 6 shows that the three groups increased significantly.

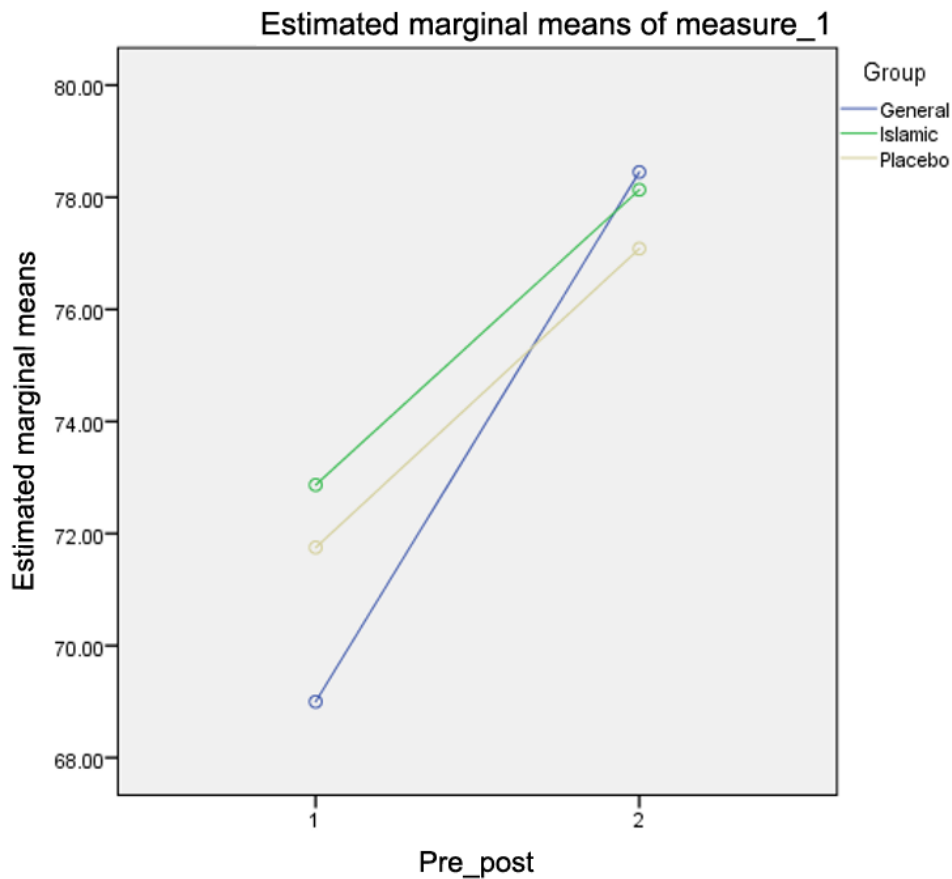


Figure 1. A plot diagram of the results.

Table 6. Post-hoc comparisons between groups and time.

Post-hoc comparisons: group * RM factor 1					
Group and time	Group and time	Mean difference	SE	T	p _{holm}
1: Pre-test	2: Pre-test	-3.87	3.40	-1.14	1.00
	3:Pre-test	-2.75	3.63	-0.76	1.00
	1:Post-test	-9.45	1.77	-5.35	< 0.001
	2:Post-test	-9.13	3.40	-2.69	0.13
	3:Post-test	-8.08	3.63	-2.22	0.33
2: Pre-test	3:Pre-test	1.12	3.85	0.29	1.00
	1:Post-test	-5.58	3.40	-1.64	0.93
	2:Post-test	-5.27	2.04	-2.58	0.17
	3:Post-test	-4.22	3.85	-1.09	1.00
3:Pre-test	1:Post-test	-6.70	3.63	-1.84	0.70
	2:Post-test	-6.38	3.85	-1.66	0.93
	3:Post-test	-5.33	2.28	-2.34	0.29
1:Post-test	2: Post-test	0.32	3.40	0.09	1.00
	3:Post-test	1.37	3.63	0.38	1.00
2: Post-test	3:Post-test	1.05	3.85	0.27	1.00

Note: P-value adjusted for comparing a family of 15.
1=General gratitude, 2=Islamic gratitude, 3=Control group.

Table 6 presents a post-hoc analysis with the results of the p-holm significance value. The advantage of calculating significance with p-holm is that the results are related. Therefore, the comparison test on one component considers the comparison test on all other components (reference). In other words, the significance of the increase in the pre-and post-test in one group considers the increase in the other group to be worth increasing (change) significantly. Specifically, the above analysis considers 15 post-hoc comparative tests.

Table 6 shows that a significant increase in OSE only occurred in the general gratitude group ($d= 1.14$; $p<0.001$). Only the general gratitude treatment was adequate compared to the treatment with Islamic gratitude ($d= 0.491$; $p= 0.17$) or placebo ($d=0.464$; $p= 0.29$). This result is corroborated by the fact that the change in the mean score (mean difference) in

the general gratitude group has the most significant mean difference (-9.45) compared to the Islamic gratitude group (-5.27) or placebo (-5.33).

5. Discussion

The present study aimed to investigate the effect of gratitude practice on online student engagement. We found no interaction between different types of treatment (general gratitude, Islamic gratitude and the control group) and an increase in online student engagement scores. However, it was found that the treatment with general gratitude had the most significant effects compared to other treatments. Several things can be discussed from the results of this study such as: 1) Does the treatment enhance the gratitude scores? 2) Why does only the general gratitude treatment have a significant effect? 3) Why does the Islamic gratitude treatment not have a significant effect? 4) Why did the group given the placebo treatment show an increasing pattern even if the mean difference was the same as the Islamic gratitude group?

The result analysis of the different assignment types of gratitude suggests that writing activities may increase gratitude scores across all groups. Therefore, there were no significant differences between the general attitude, Islamic gratitude, and the control group regarding their post-test gratitude scores. Although the task in the control group did not explicitly relate to gratitude, the gratitude scores were slightly inclined to reach a moderate effect ($d= 0.464$). It shares the same finding with [Enmons and McCullough's \[41\]](#) study where the gratitude group did not differ significantly from the event conditions [41].

Only the group with general gratitude exercises impacts online student engagement based on the post hoc analysis. The general gratitude treatment has a large effect ($d=1.14$) in line with previous research on the efficacy of general gratitude intervention. Meta-analysis studies have consistently underlined the positive effect of such treatment on various psychological conditions [14, 20, 46-48]. Several studies found the effectiveness of this treatment on several variables i.e. increasing adolescents' desire to contribute to society [49], reducing depression symptoms [50], stress levels and negative effects [51], helping to increase positive affect [52, 53], happiness [54], subjective well-being [55], mental well-being [56], psychological well-being [54, 57] and individual quality of life [57]. In the academic context, general gratitude treatment has shown potential impact in enhancing academic motivation [58], academic resilience [59], students' psychological well-being [19] and strengthening the atmosphere of the classroom and learning [60, 61]. Those established effects have contributed to student engagement in our study.

Unlike what we expected, the Islamic gratitude treatment did not significantly affect online student engagement. The Islamic gratitude assignment may require deeper reflection and understanding of Islamic values. Consequently, it posed challenges in operationalizing the brief intervention. Some studies indicated that Islamic gratitude requires reflection [62], deepening [63] and reflection [64] whose operationalization cannot be equated with the treatment of the general gratitude. Islamic gratitude needs a more complicated design because it not only presents an appreciative attitude but also requires the presence of a transcendental dimension [63, 65], Islamic values [65] and basic knowledge of Islamic gratitude [63, 66]. It is difficult to summarize with a brief treatment. In this study, summarizing Islamic gratitude only with diaries does not seem sufficient and fails to achieve the ideal treatment of Islamic gratitude. Therefore, further research can use a more established procedure of Islamic gratitude treatment as developed by [Rahmah and Julianto \[67\]](#), [Sulistyarini \[68\]](#) or [Rachmawati, et al. \[69\]](#). Building an Islamic grateful intervention may be possible with a short operationalization. However, in-depth research is needed to design the procedure. Each component of Islamic gratitude, being grateful with knowledge, heart, verbal and deed (References [al-Ghazālī \[70\]](#); [Ibn Qayyim \[71\]](#) and [Ali, et al. \[66\]](#)) can be represented.

Placebo has a pattern of improvement from pre-to post-tests that can be caused by the type of placebo whose content has a direct or indirect influence. Some of the components considered to have an effect include the placebo introduction. Induction of the subject to activate their attention in daily life will be passed and will affect it shortly. This placebo potentially evokes a dimension of reflection in a person. The reflection process has many psychological effects such as being a means that facilitates individuals to express their feelings and values [72] increasing psychological well-being, reducing stress [73], helping in self-regulation [74], increasing self-efficacy and increasing affective motivation to be more positive [75]. The reflection process may affect OSE indirectly. Therefore, the placebo must be improved and remade with almost no psychological effect.

6. Conclusion

Treatment with general gratitude gave the most significant increase in OSE compared to other treatments. Thus, general gratitude can be used as the primary intervention to improve students' OSE. The treatment with Islamic gratitude may not be comprehensive enough procedurally and ideally requires a longer process. Thus, further studies are needed to build a more concise and complete Islamic gratitude intervention.

The placebo does not psychologically affect the subject. It is necessary to develop a placebo administration procedure with maximum neutrality. The placebo that has a psychological effect will interfere with the results of the analysis and make it difficult to interpret the results. This can have the potential to be biased in making decisions about the answer to the hypothesis. Retesting this experimental model seems necessary to get valid results. However, a more mature pilot study is needed to develop an Islamic gratitude intervention and a truly tested placebo procedure.

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