Enhancing Argumentative Writing Via Online Peer Feedback-Based Essay: A Quasi-Experiment Study

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This study investigates the impact of unwritten, written, and managed online feedback on students' argumentative essay writing skills, feedback quality, and domain-specific knowledge acquisition. This study uses an experimental study with experimental and control groups to see the effect of online peer feedback on students' argumentative essay writing skills. The research participants were 270 students from Universitas Pendidikan Indonesia who were randomly divided into 135 pairs and randomly assigned to 3 conditions (unwritten, written and managed peer feedback). The online peer feedback platform is the college's own Integrated Online Learning System. The instruction guide is designed within this platform. Through this research, students are asked to write argumentative essays (individual), interact in peer argumentative feedback, and finally improve based on feedback from colleagues. The results showed that the intervention in the form of an essay writing learning process guide design through online peer feedback had a positive impact on students' ability to write argumentative essays, the quality of the feedback, and the level of students' domain-specific knowledge. In general, from the three conditions, students who were in the written condition were superior to all aspects of the ability being tested. This happens because written feedback makes students more organized in expressing their input, has time to review the feedback so that it is of high quality, and is better able to understand deeply in exploring topics, so that the level of student domain knowledge increases. The implication of this research is that it provides an alternative that online peer feedback learning can be used for students' argumentation skills. The ability of scientific argumentation is needed by students in producing scientific writings in universities.

Keywords: online peer feedback, argumentative writing, argumentative essays, collaborative e-learning, enhancing argumentative writing

INTRODUCTION

Writing is one of the language skills that are often trained at the college level (West et al., 2019). For example, students are given the task of making various written works such as essays on various topics such as education, language, sociology, health, and biotechnology and so on. Although essay writing training is the best way for students' argumentation skills, teachers are often dissatisfied with the arguments presented in their writings (Robertson, 2014; Tsemach & Zohar, 2021). This is caused by the lack of strong arguments presented. A good scientific argumentative essay must meet the criteria, namely the claim must be supported by arguments, reasoning, evidence or data, and if necessary, the opposite argument must be included to strengthen the author's argument (Tsemach & Zohar, 2021; Valero Haro et al., 2019). Writing argumentative essays requires a strong argumentative approach. Students often fail to use this argumentative approach in their writings. There are several causes of the students' lack of ability to write argumentative essays, including there are still many students who do not know the characteristics of a good argumentative essay, they still find it difficult to apply them due to lack of practice, and do not know deeply about the features of argumentative essays (Meyer, 2005; Noroozi et al., 2020). This causes students to find it difficult to meet the demands of lecture assignments because almost all scientific papers in universities require strong arguments. This situation requires teachers to be able to facilitate students to be able to write good argumentative essays (Lephalala & Pienaar, 2008; Robertson, 2014).

The phenomenon of the low ability to write argumentative essays among students implies that students need additional support from teachers to improve their ability to write quality argumentative essays (Hadianto et al., 2022; Jasinski, 1988). Online peer feedback is one of the best strategies to improve students' argumentative essay writing skills (Green, 2007; Heitmann et al., 2014). Several previous studies have proven that peer feedback can improve student writing quality, feedback quality, acquire domain-specific knowledge, and change students' attitudes towards written subjects (Fischer & Gottweis, 2013; Goldberg et al., 2011). Although this peer feedback method has been proven to be effective, there are some criticisms in its implementation, including the quality of feedback that does not meet the criteria due to poor knowledge and ability of students, emotional and psychological problems in giving and receiving critical feedback from colleagues (Howell et al., 2018; Noroozi et al., 2020). This challenge indicates that this peer feedback method needs to be supported by a condition that can optimize its function.

One of the learning environments that can be used as a means to improve the quality of essay writing is an online learning environment (Awada & Diab, 2021; Bauler & Wang, 2019). This facility can be used to optimize the intensity of feedback by students without a time limit and can be done anonymously (Huang & Jun Zhang, 2020; Latifi et al., 2020), so that the quality of feedback is maintained. The online learning environment also optimizes the timeliness used to review feedback or receive feedback from colleagues. Through an online learning environment, teachers are more likely to provide various types of instruction such as mentoring and mentoring so that students can

provide more relevant and quality feedback (Radhakrishnan et al., 2010; Robertson, 2014). Several instructional approaches have been tried in previous research, including open debate through platforms, role playing in various contexts, peer interaction, argumentation sentence correction, delivery and gambling sections, peer interaction, inserting textual content fields and quick and critical questions to practice skills. argue, and so on (van de Weijer et al., 2019; Noroozi et al., 2020; Prata et al., 2019). All of these approaches are included in "Drafting". Several previous studies have proven that these methods are effective in improving the quality of student writing, but these methods have their own challenges, for example, being too detailed, causing a burden and hindering the learning process (Huang & Jun Zhang, 2020; Robertson, 2014)..

In addition, this drafting method can limit the freedom and creativity of students in viewing a problem that is presented as an object of learning (Şimşek, 2020; Valero Haro et al., (2019). This can be overcome by teachers by designing instructional strategies that are able to encourage students' argumentation skills without limiting the creativity aspect of students (Ferretti et al., 2007; Fischer & Gottweis, 2013). The effectiveness of simple instruction and guidance can be seen in before and after feedback in improving students' argumentative essay writing skills. However, from several previous studies, there has been no study comparing the effectiveness of the feedback method between unwritten, written, and managed feedback. So, the difference between this study and previous research is that students' conditioning in giving and receiving feedback is divided into three conditions. The division of this condition is done because it is to find out the most effective feedback under which of the three conditions. In addition, the difference in these conditions is to see the implementation of the instruction design that is designed to be more suitable under what conditions by looking at the quality of argument essays, feedback quality, and increasing student knowledge. In addition, the difference between previous research and current research is that it is not clear how students respond to the feedback they receive.

The use of these three conditions is based on research and references from Lipnevich, A. A & Panadero (2021) who developed the MISCA (Message, Implementation, Student, Context, Agents) feedback model. First, feedback based on the MISCA model emphasizes the message or quality of feedback given by colleagues which builds on the quality of their writing. Implementation is that the teacher must be able to design feedback settings that are carried out in each condition. The student component is a feedback model that must pay attention to student characteristics and must be student-centered. Teachers must be able to place students with the right partner so that quality is built. Students themselves must be involved in constructing their own knowledge. Feedback must also pay attention to context, meaning that the quality of feedback must be adjusted to the subject or topic written in the argumentative essay, and finally the agent element. The agent becomes the main actor in implementing feedback in accordance with the designed instructional design. Feedback in learning to write argumentative essays at least involves the teacher, colleagues, other students. Technology acts as a source of feedback. The agent interacts according to the instructional context. Therefore, this study focuses on argumentative writing through

online peer-feedback-based essays and compares its effectiveness among the three methods, namely unwritten, written, and managed. The effectiveness seen is the result of learning to write argumentative essays, the quality of feedback, and the acquisition of domain-specific knowledge. Therefore, the researcher formulated the research question as follows.

(1) How effective is unwritten, written, and managed peer feedback online on the quality of argumentative essays?
(2) How effective is the online unwritten, written, and managed peer feedback on the quality of peer feedback?
(3) How is the effectiveness of online unwritten, written, and managed peer feedback on students' domain-specific knowledge acquisition?
(4) What do students think about the online feedback method to improve their essay writing skills?

Literature Review

Peer feedback

Strong truths about the usefulness of peer feedback have been found in four theories namely: process-based writing approaches, collaborative learning, Vygotskian learning theory and interaction theories in the second language acquisition process. Peer feedback is seen as an important support for restructuring a process approach to writing. Collaborative Learning Theory encourages students to pool their learning resources as well as complete assignments (Mercader et al., 2020; O'Neill et al., 2019). They can not do it in their own way but it is learning through dialogue and interaction with peers. Vygotsky's approach also underscores the primacy of social interaction with peers as in his quote, namely the theoretical idea from the Zone of Proximal Development which states that writing skills can emerge with the help of others. Peer feedback, which has other different terms such as peer response, peer review, peer editing, and peer evaluation can be defined as a form of 'utilizing' students as sources of information and interacting with each other as a way in which students assume their roles and responsibilities as usually taken by a trained teacher, instructor, or editor in providing suggestions and criticizing each other's written drafts orally in the writing process (Alqassab et al., 2019; Donia et al., 2022). As a result of the ineffectiveness and imprecision of teacher-to-student feedback, the use of peer feedback has become widespread in teaching writing, especially in first language contexts.

The key to using peer-to-peer support is to change students' roles in the classroom. In addition, peer feedback can increase student engagement and insight, where students are given another role as reader and mentor in the writing process (Huisman et al., 2018; Kasch et al., 2022). Furthermore, students can become independent and responsible in the learning process. The use of peer feedback as a model in the writing process has become popular and is often done in the English learning process. This method involves collaborative learning where students review and evaluate the writings of their peers. This process has the benefit of increasing the understanding of the learning process, and therefore improving the quality of students' final writing (Hadianto et al., 2021c; Tasker

& Herrenkohl, 2016; Wood, 2022). In addition, suggestions and criticism from peers is a fundamental part of the learning process. This can motivate students, they can have understanding as listeners, and improve the learning process. Learning is not an individual activity; Rather it is a natural cognitive activity about the learning process that shifts from an individual-focused learning process to an interactive learning process in a social context. Thus, interaction with peers is important to the improvement of student learning, because it allows students to gain knowledge through social interaction. Furthermore, views on peer feedback in relation to socio-cognitive approaches to learning, and the contribution of cooperative learning to means of providing feedback and developing better writing. As a method for implementing the peer feedback process, the guides and worksheets provided by the teacher are of the utmost importance in order to save time and contribute to effective and efficient feedback. In the guide, students should be guided how to process feedback from peers (Panadero & Lipnevich, 2022; Zong et al., 2021). The next important thing is to improve students' competence in reading and responding to other students' papers, which can reduce communication and discussion difficulties between fellow students. Meanwhile, peer feedback activities can be used to perform various types of tasks, such as generating ideas, pre-writing activities (pre-writing), or writing editing activities, and so on. Finally, several influential factors should also be considered, such as values, culture, group needs, and how to exchange papers, and to provide feedback in the form of written feedback, and time management.

This research is based on the feedback model developed by Lipnevich, A. A & Panadero (2021) who developed the MISCA (Message, Implementation, Student, Context, Agents) feedback model. First, feedback based on the MISCA model emphasizes the message or quality of feedback given by colleagues which builds on the quality of their writing. Implementation is that the teacher must be able to design feedback settings that are carried out in each condition. The student component is a feedback model that must pay attention to student characteristics and must be student-centered. Teachers must be able to place students with the right partner so that quality is built. Students themselves must be involved in constructing their own knowledge. Feedback must also pay attention to context, meaning that the quality of feedback must be adjusted to the subject or topic written in the argumentative essay, and finally the agent element. The agent becomes the main actor in implementing feedback in accordance with the designed instructional design. Feedback in learning to write argumentative essays at least involves the teacher, colleagues, other students. Technology acts as a source of feedback. The agent interacts according to the instructional context. All these components are illustrated in the designed instructional design.

Argumentative Essay

An essay in a general sense is a prosaic discussion of ideas or thoughts that are still fragmented. Because it is still fragmented, there are writers who say that an essay is a piece of prose literature written to provide a personal exposition of a subject (Awada & Diab, 2021; Bauler & Wang, 2019). Webster Dictionary mentions that essay is a short literary composition of an analytical, interpretive, or reflective kind, dealing with its

subject in a nontechnical, limited, often unsystematic way and, usually, expressive of the author's outlook and personality. Meanwhile, the Oxford Dictionary defines an essay as a free-length essay on a side of the problem which was originally shown by short essays, but is now also used to name quite complex essays, although still in a limited range. In addition, the Indonesian essay is a type of prose writing that describes problems in the fields of literature, arts, culture, science, and philosophy; based on observations, stripping, interpretation of real facts or prevailing responses by presenting the ideas and insights of the author himself (Huang & Jun Zhang, 2020; Latifi et al., 2020). In essays, the author expresses a certain point of view, a personal attitude, brings his own discoveries, Meanwhile, the International Encyclopediae states that an essay is a prose pronunciation of medium length, usually with a limited topic. Essays are aimed at the general public and seek to communicate ideas, theses, or information in the form of discourse with free anecdotes, illustrations and everyday examples that illustrate the experiences of the general public (Fan & Chen, 2021; West et al., 2019). An essay is a writing, essay, analysis, or interpretation of something. Most are more or less limited in topic, with breadth, style and free methods, although they are generally readable in one sitting. According to journalism, an essay is a writing in the form of someone's opinion about a problem that is subjectively reviewed from various aspects or fields of life.

An argument is an essay that proves the truth or untruth of a statement. In the argument text, the writer uses various strategies or rhetorical devices to convince the reader about the truth or untruth of the statement. Argumentation is an essay that tries to give reasons to strengthen or reject an opinion, position, or idea. Argumentative essays must contain arguments, namely evidence and reasons that can convince others that the opinions expressed are true (García et al., 2020; Latifi et al., 2020). Argumentation is a form of rhetoric that seeks to influence the attitudes and opinions of others, so that they believe and ultimately act in accordance with what the author wants. Through argumentation, the writer is able to assemble the facts in such a way, so that he is able to show whether an opinion or a certain thing is true or not. The basis of argumentative writing is critical and logical thinking. This makes argumentative writing based on logical facts. Reasoning must be the basis of an argumentative essay. Reasoning is a thought process that seeks to connect known facts or evidence to a conclusion. Thinking that tries to connect to reach a logical conclusion. Evidence is all existing facts, all testimonies, all information, or authority, and so on that are connected to prove a truth. Based on the explanation above, it can be concluded that the argumentative essay is a type of essay that is used to express an opinion and try to convince others of the truth of that opinion. The author tries to convince the truth of his opinion by including facts and logical evidence.

METHOD

Participants

The quasi-experimental research method with the experimental class was used in this study. Participants in this trial were 270 students who took language, social, and science study programs at the Indonesian Education University. The research uses an integrated

online learning system facility provided by the university. Determination of the sample is done through random sampling technique. Students were divided into 135 pairs and conditioned on unwritten feedback (45 pairs), written (45 pairs), and managed situations (45 pairs). Students who were conditioned to receive unwritten feedback were used as a control group so that they did not receive instructional support from the teacher during online feedback. Students who were conditioned to receive written feedback were supported by instruction that encouraged argument in the form of guided questions during their online peer feedback. Students who are conditioned in a managed/supervised condition get online instructions and how to provide feedback to their partners before the feedback phase is carried out. This research was conducted for 2 months where in one week the researcher carried out 4 feedback sessions to hone essay writing skills, improve the quality of feedback, and increase students' specific domain knowledge.

The average age of the students was 21.22 (SD = 1.54) years with a male and female sex composition of 50% each. The topics used in the essay learning are distance learning, the performance of the Indonesian government during the pandemic, and the level of welfare of the Indonesian people. The intervention in this study was that students were given information regarding instruction in giving and receiving feedback and understanding of argumentative essays. Through this intervention, students can understand how to provide feedback in accordance with the criteria for a good argumentative essay, and students will know how to improve the quality of writing as well as the quality of feedback. At the same time, the level of students' domain knowledge increases due to the quality of the feedback process. The intervention design depicted in Figure 1 was designed by the researcher based on the feedback theory of Lipnevich, A. A & Panadero (2021). After the intervention was carried out, then, they tried to make an essay on the topic and received feedback according to three conditions, and finally students were given the opportunity to revise it. For more details related to the steps can be seen in Figure 1.

The feature that focuses on feedback is designed based on the theory of argumentation and argumentative essays proposed by Noroozi et al., (2016) and Toulmin, (1958). The criteria for a quality essay are a clear position of the author, in accordance with the context, accompanied by arguments, evidence, and data in the form of facts or expert opinions that strengthen and oppose, integration of pro and contra opinions, and final conclusions that strengthen the author's position on the essay. Researchers designed this feedback in the form of items included in the integrated online learning system owned by the campus. The task of the partner or partner is to give an assessment of their partner's essay based on these components, whether it is correct or some are still lacking, along with reasons that can improve the quality of their partner's essay writing.
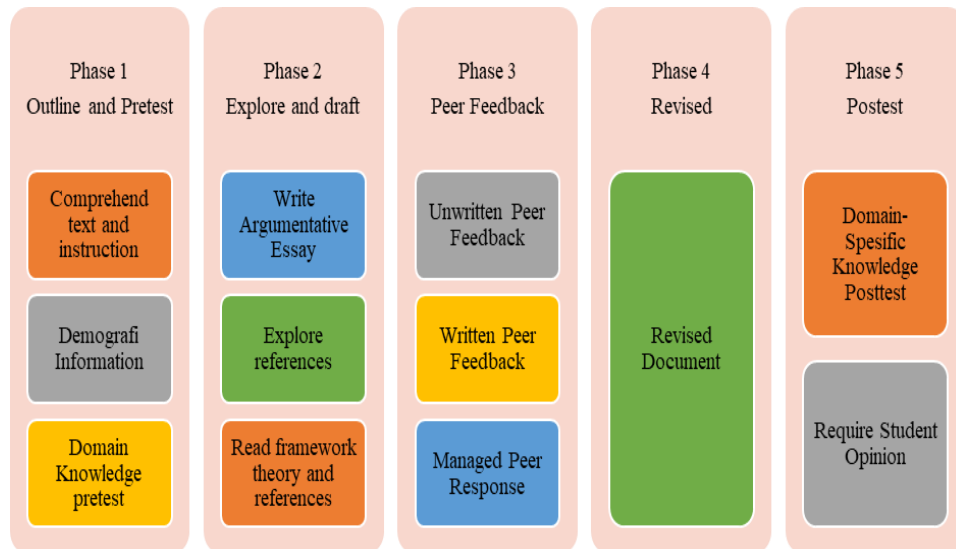
Figure 1
Learning tactics embedded withinside the integrated online learning system platform

Procedure

The study was carried out according to the steps listed in Figure 1. The research procedure was divided into 5 phases which took place over a period of 6 consecutive weeks. The following is the research procedure based on the phases designed by the researcher. 1) in the first phase, students get an introduction to information about the features of the learning system and material about argumentative essays. After that, a pre-test was done to make an essay before getting treatment. In the first phase, the researcher conducted a survey of demographic variables and domain-specific knowledge of students (40 minutes). In the second phase, students are given the opportunity to read articles on predetermined topics and are allowed to search from other references, such as the internet (40 minutes). In the second phase, students are assigned to write an argumentative essay on the topic (distance learning, the performance of the Indonesian government during the pandemic, and the level of community welfare) by choosing it (90 minutes). In the third phase, peer feedback is carried out. Students are given the opportunity to first read their partner's essay draft and provide feedback based on predetermined essay features (60 minutes). The fourth phase, namely the revision phase. In this phase, students are instructed to read comments or input from their friends on the essay they have made and are given the opportunity to revise it according to their partner's input or comments (70 minutes). And the last phase is the post test phase. In this phase, students are given a questionnaire to assess their domain-specific knowledge about these topics and are given the opportunity to write down their opinions about the process of learning to write essays that they have gone through. This research was conducted for 2 months where in one week the researcher carried out 4 feedback

sessions to hone essay writing skills, improve the quality of feedback, and increase students' specific domain knowledge.

Instruments and Measurement

The assessment of the quality of argumentative essays in the drafting and revision phases uses an assessment developed by the author. This assessment consists of quality argumentative essay features according to the literature. This assessment includes eight aspects, namely 1) the author's position on the topic, 2) introduction to the topic, 3) the author's claims that support the position, 4) evidence that supports claims that support the topic, 5) claims against the topic 6) evidence strengthens claims against the topic. topics, 7) consideration of benefits and disadvantages, 8) conclusions. The point on each component has a single value. A score of 0 for students who do not include components, a score of 1 for students who write but does not describe completely/clearly, a score of 2 for students who write components completely, deeply, and clearly. The score range for each component is 0-2. Then, each point in each component is added up to become the final score for essay quality. Reliability and validity tests were carried out through expert judgment. The results of the reliability test reached an agreement index with a score of 82% in the draft phase and 85% in the revision phase. An assessment was also carried out to assess the quality of the feedback using the same method and got a score of 85% of the data. The measurements used to measure the quality of argument feedback and the level of knowledge use a scale for measuring aspects of essays and arguments with the same Linkert scale. So, the quality or not of the feedback as well as the depth of knowledge or essay topic is based on the essay criteria with a linkert scale order of 1-5.

This study also used a questionnaire to measure domain-specific knowledge which was carried out during pre and post-tests. The questionnaire consists of 15 multiple choice questions. Students are instructed to choose an answer from 4 options with 1 point for each correct answer. The maximum score of the questionnaire is 15 in the pre-test and post-test. This questionnaire was designed by the researcher which contains 40 items and is divided into 4 parts. The rating scale uses a 5-point Likert scale (Noroozi and Mulder, 2017). First, assessing the impact of domain-specific learning on students' feelings, second, assessing the impact of general domain learning on students' feelings, third, assessing students' opinions about the ease of use of the instruction, and fourth, assessing students' appreciation of the instructional design. The results of the reliability test of the questionnaire were Cronbach = 0.85, 0.87, 0.86, and 0.90).

FINDINGS

The presentation of research results is based on the formulation of the problem proposed, namely the effect of online peer feedback on the quality of argumentative essays, the effect of online peer feedback on the quality of students' argumentative feedback, the effect of online peer feedback on domain-specific knowledge levels, and students' opinions about the use of feedback systems back online colleagues.

Table 1
Results of intervention online peer feedback at some condition

Variables		Situation	M (SD)	F	Sig	Tukey HSD
Argumentative essays quality		Unwritten Draft	3.52 (1.16)	18.81	0.001	Written and Controlled > Unwritten
		Revised	4.56 (0.71)			Written > Controlled
		Written Draft	5.77 (1.44)			
		Revised	11.44 (2.48)			
		Controlled Draft	4.23 (1.44)			
		Correction	7.28 (2.12)			
Argumentative feedback quality		Unwritten	1.67 (2.03)	31.76	0.001	Written and Controlled > Unwritten
		Written	12.07 (3.86)			Written > Controlled
		Controlled	7.12 (4.95)			
Domain-specific knowledge		Unwritten Pre-Test	2.84 (0.97)	4.44	0.01	Written and Controlled > Unwritten
		Post-Test	4.34 (1.91)			Written = Controlled
		Written Pre-Test	3.44 (1.08)			
		Post-Test	6.94 (1.75)			
		Controlled Pre-Test	3.37 (1.45)			
		Post-Test	6.28 (1.57)			
Actuate and Pleasure during the Learning	Impact of the domain-specific learning outcomes	Unwritten	3.68 (0.43)	8.18	0.01	Written and Controlled > Unwritten
		Written	4.13 (0.47)			Written = Controlled
		Controlled				
	Impact of the domain-universal learning outcomes	Unwritten	3.98 (0.28)	5.84	0.005	Written and Controlled > Unwritten
		Written	4.36 (0.46)			Written = Controlled
		Controlled	4.41 (0.43)			
	The ease of using module	Unwritten	4.23 (0.62)	1.26	0.29	Written = Controlled = Unwritten
		Written	4.28 (0.62)			Written = Controlled = Unwritten
		Controlled	4.53 (0.46)			
	Module appreciation	Unwritten	4.12 (0.48)	1.54	0.22	
		Written	3.97 (0.52)			
		Controlled	4.27 (0.43)			
	Total	Unwritten	4.02 (0.33)	4.93	0.01	Controlled > Unwritten Controlled = Unwritten
		Written	4.18 (0.34)			Written = Controlled
		Controlled	4.36 (0.33)			

The Impact of Online Peer Feedback on the Quality of Argumentation Essays

Based on the results of repeated measurements using table 1 ANOVA test, this online peer feedback describes the effect on the quality of argumentative essays made by students. This can be seen in the significant impact of online peer feedback on the quality of argumentative essays. Improving the quality of the argument can be seen in the draft or essay-making phase and the revision or improvement phase after getting feedback from the partner. This increase can be seen in the value of , $F(1, 48) = 115.19$, $p < 0.001$, $\eta^2 = 0.75$. In addition, there are other interesting findings, namely there is a significant difference between conditions between written, unwritten, and controlled feedback. This significant difference was seen from the quality of the students' argumentative essays in each condition with a value of $F(1, 48) = 19.81$, $p < 0.001$, $\eta^2 = 0.44$. Furthermore, to see more clearly the differences between these conditions, the

researchers conducted the Tukey HSD post hoc test. Based on the test results, the argumentation essay scores of students who were in the written condition showed a significantly higher increase than the argumentation essays of students who were in the condition that received unwritten online peer feedback with a p value of <0.001. This is because the input or comments given in writing by their colleagues are easier to understand and follow to improve their essays. In addition, the argumentation essay score in the managed condition showed a significantly higher increase than the argumentation essay score in the unwritten condition with p <0.001. Students who are in a managed condition are able to provide input in accordance with the instructions or directions of the teacher so that they are right on target in improving their colleagues' essays, so that their colleagues are able to improve the quality of their essays according to the criteria. And, the score of argumentation essay quality in written condition is higher than the score of argumentation essay of students who are in managed condition. Students who are in a written condition are better able to follow input or comments in writing and are on target in improving them. The increase and difference in each condition can be seen in table 1.

Impact of Online Peer Feedback on The Quality of Argumentative Feedback

Based on the one-way ANOVA test in table 1, the researcher found a significant difference in the quality of argumentative feedback between conditions, namely written, unwritten, and managed conditions with a value, $F(1, 50) = 32.76$, $p < 0.001$. Based on the Tukey HSD post hoc test, the average score of peer feedback quality in the written condition showed a significantly higher improvement than the peer feedback quality in the unwritten condition with $p < 0.001$. This increase occurred because student feedback on written conditions was more organized in providing comments in accordance with the directions and instructions of the teacher. This does not happen to students who are in an unwritten condition. Even though they provide input or comments based on the shortcomings they find in the essay, students are still not systematically optimal in the aspects that become argumentative assessments. In addition, the researcher found that the quality score of online peer feedback in the managed condition was higher than the quality of argument feedback in the unwritten condition with $p < 0.001$. Student feedback in the managed condition is better than in the unwritten condition because students in the managed condition get direction and guidance from the teacher in providing input to their partner. The researcher also found that the feedback quality score in the written condition was higher than the managed condition with $p < 0.001$. An interesting thing happened in the written condition, the quality of the feedback in the written condition was better than the managed condition because the feedback or input given in writing was more detailed and detailed, the partner was able to understand and follow the input optimally. Even though students in the managed condition get directions on how to provide feedback, their input or feedback that is conveyed orally lacks detail and is not optimally understood by their partners. For more details can be seen in table 1.

Impact of Online Peer Feedback on Domain-Specific Knowledge Levels

Based on the results of the ANOVA test, the researcher found that online peer feedback had a significant impact on the level of domain-specific knowledge. The increase was

seen from pre test to post test in each condition with a value of $F(1, 48) = 87.72$, $p < 0.001$, $\eta^2 = 0.65$. From the results of this test, it was also found that there were differences in the level of domain-specific knowledge between conditions with a value of $F(1, 50) = 4.44$, $p < 0.001$, $\eta^2 = 0.16$. To see more clearly between these conditions, the next researcher conducted a post hoc Tukey HSD test. The score of students' domain-specific knowledge level in the written condition experienced a significantly higher increase than the domain-specific knowledge level in the unwritten condition with $p < 0.001$. This is because there is a pause used during writing to express thoughts about the knowledge that is the topic of the essay. In the feedback phase in the written condition students have time to generate schemata about the essay topic which is then written based on the features of the argumentative essay. This process causes the level of student-specific domain knowledge to be better than students who are in an unwritten condition. In addition, it was found that the level of domain-specific knowledge of students who were in the managed condition was higher than the level of knowledge of students in the unwritten condition with $p < 0.004$. This difference is caused by students who are in a managed condition getting intervention on how to provide feedback, so that they are better able to organize their thoughts on essay topics. This means that students' specific domain knowledge becomes better trained and better than students who are in an unwritten condition. And finally, the researcher found that there was no significant difference between the students' knowledge level in the written condition and the managed condition. This happens because students in both conditions are equally trained in expressing their thoughts on the topic of their essays in a more organized manner.

Student Opinion on Using Online Peer Feedback System

Referring to table 1, in general students have a positive opinion about the use of the integrated online learning system provided by the campus for online peer feedback. All students on average get a fairly high score on the Liker scale with a value range of 4-5 regarding their opinions about online learning suggestions for learning to write argumentative essays. Based on the results of the one-way ANOVA test, it was found that there were significant differences in student opinions between the three conditions, namely the oldest, unwritten, and managed with a value of $F = 4.94$, $p < 0.01$. Based on the Tukey HSD post hoc test, it was found that the significant difference was only in learning outcomes between the general domain and the specific domain in the written and managed conditions. Both conditions are better than the unwritten condition. This happens because online peer feedback in managed conditions and written feedback by students gets more attention from the teacher so that it is more organized. This has a positive impression on students. Another finding is that there is no significant difference in the aspects of student convenience and appreciation of the online learning system owned by the campus.

DISCUSSION

Based on the research findings, this online peer feedback overall has a significant impact on students' ability to write argumentative essays. Although the significance of each condition (written, unwritten, and managed) differs due to several factors. In addition, this online peer feedback has a positive impact on the quality of the arguments and the

level of domain-specific knowledge about the topic of written argumentative essays. This increase proves that the online peer feedback intervention has a positive impact on various conditions, although the level of significance differs between conditions. This is in accordance with the theory which says that peer feedback can improve students' writing skills because their friends' input or comments can build writing quality if the input is in accordance with the teacher's instructions (Klumpp, 2009; Lee et al., 2009). This feedback process allows students to learn more about the material about the criteria for argumentation essays and topic knowledge that can improve the quality of writing, the quality of arguments, and the level of students' domain knowledge (Awada & Diab, 2021; Bauler & Wang, 2019) . The research findings show that all students' abilities in the written condition are better than the other two conditions, namely the unwritten condition and the managed condition. This finding is in line with previous studies that studied the effect of feedback on the quality of student writing on various types of texts. The process of giving and receiving feedback from partners during argumentation essay assessment helps students to better understand and deepen the criteria for argumentation essays as well as deepen the topics they are writing about (Álvarez Valdivia & Lafuente Martínez, 2019; García et al., 2020). This feedback process is carried out based on instructions and following the design procedures made by the teacher. So, when students provide feedback, students pay attention to these criteria not based on their own perspective. This makes the ability to write arguments, the quality of arguments, and the level of knowledge increase.

Another finding shows that students who are in a managed condition have better abilities than students who are in an unwritten condition. Students who are in this managed condition receive direction regarding instructions in providing feedback. Detailed instruction on methods for providing feedback keeps students engaged in quality cognitive processes. The pair's input includes strengthening arguments, strengthening data, and writing organization which makes students able to improve the quality of their writing and the quality of their feedback is better than the ability of students who are in an unwritten condition (Dingler, 2017; Hadianto et al., 2021a). However, there are other findings, namely the ability of students in the managed condition is lower than the ability of students in the written condition. This is because students who are in a managed condition are not instructed to provide written feedback. Feedback in writing will make the feedback more organized and there will be time to review the feedback (Hadianto et al., 2022; Latifi et al., 2020). On this occasion, the feedback given by students in written conditions is of higher quality than those in managed conditions. This is in accordance with the phenomenon in the field that students find it easier to follow written instructions compared to verbal instructions. Likewise, written input is easier and more thorough to follow in making improvements to the argumentative essay.

Another finding regarding student opinions about the use of online learning system facilities and feedback techniques received a positive impression from all students. Basically the purpose of learning is to foster student motivation to achieve learning objectives with a positive impression. This positive impression will provide a pleasant learning experience for students. In general, students gave the opinion that in following the instructions at each phase it was easy to understand and clear. In addition, the online

learning system facilities provided by universities are able to provide instructions and there are no technical obstacles. All students appreciated the 5-phase instruction designed by the researcher because it was able to improve students' ability in writing argumentative essays, quality of feedback, and level of student-specific knowledge. Comparison of the author's opinion in more detail, including the acquisition of scores in the written and managed conditions, gave more positive opinions than students who were in the unwritten condition. The same was found at the domain-general and domain-specific knowledge levels. This condition occurs because students who are in a written and managed condition feel that the support of instructions and directions in carrying out the feedback process can improve students' abilities in general (Hadianto et al., 2021b; Hill, 2015; Howell et al., 2018). In contrast to students in unwritten conditions who did not receive instructional intervention in providing feedback

Overall, the research findings indicate that online peer feedback is effective in improving scientific argumentation writing skills. The effectiveness of this peer feedback method can be seen in improving the quality of arguments, the quality of feedback, the level of students' domain knowledge, as well as positive opinions from students. This proves that cognitive processes that involve students directly will be more effective than just giving directions. This writing and feedback process makes students aware of their shortcomings and understands better how to improve them. Of the three conditions, students who are in a writing condition are superior in all aspects compared to students who are in an unwritten and managed condition. This strengthens previous research that writing is able to make students better able to organize and deepen their understanding (Lephalala & Pienaar, 2008; Meyer, 2005). Instructions or comments in written form can also be more effective in helping students improve the quality of writing. This online peer feedback method can be an alternative in improving the ability to write various types of text.

CONCLUSION

This study has proven that an intervention in the form of an essay writing learning process guide design through online peer feedback has a positive impact on students' ability to write argumentative essays, the quality of the feedback, and the level of students' domain-specific knowledge. In general, from the three conditions, students who were in the written condition were superior to all aspects of the ability being tested. This happens because written feedback makes students more organized in expressing their input, has time to review the feedback so that it is of high quality, and is better able to understand deeply in discussing topics, so that the level of student domain knowledge increases. The improvement of student abilities is also supported by an online learning system (Integrated Online Learning System platform) which is able to facilitate students in receiving and providing detailed feedback. This is what makes the quality of argumentative essays, feedback, and level of domain specific knowledge increase. The feedback process carried out by students. This argumentative essay can be used as an alternative in training students' argumentation skills before making a more difficult paper. The implication of this research is that it provides an alternative that online peer feedback learning can be used for students' argumentation skills. The ability of scientific argumentation is needed by students in producing scientific writings in universities.

There are several limitations in this study, including this study did not delve deeper into the abilities of students based on gender, a limited sample, and limited qualitative analysis. Based on these limitations, the researcher suggests that future research should pay more attention to the gender variable, large samples, more diverse texts, and more qualitative analysis in order to better explore the variables that affect students' argument writing skills.

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