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Igniting Cutting-Edge **Innovations** in Science, Technology, Humanities for Sustainable Future

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Igniting Cutting-Edge Innovations in Science, Technology, Humanities for Sustainable Future

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Universitas Negeri Semarang 2022

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Welcoming Speech from the Director of the Postgraduate Program of UNNES

As the Director of the Postgraduate Program of UNNES, we are proud to have an annual International Conference on Science, Education and Technology (ISET) organized by the the Postgraduate Program. This is the eighth (8th) ISET in 2022. This year's ISET takes up the theme 'Igniting Cutting-Edge Innovations in Science, Technology, and Humanities for Sustainable Future'. Under such an umbrella term, hopefully this year conference could discuss not only the mainstream perspectives on Science, Technology, and Education for humanity, but also the many alternatives that are not frequently discussed. Because big ideas often come from the unforgotten.

To be chosen as presenters for the parallel presentation in this conference is a considerable honor and achievement. I would like to congratulate the presenters who have been selected, as well as the reviewers who have chosen the successful presenters. Obviously not everyone interested in the chosen topic could attend this conference, so the conference proceedings will present to a much wider audience issues related to the topic. The proceedings is also a proof that the contributions of presenters are valued. I also would like to offer my congratulations and appreciation to the organising committee who have been working hard to prepare the conference, and to all keynote speakers (Professor Tanya Fitzgerald from the University of Western Australia, Professor Sue Grishaber from La Trobe University, Professor Ooi Bon Seng from Universiti Sains Malaysia, Dr. Rahila Umer Sumalani from BUITEMS, Pakistan), presenters, and participants for such an impressive conference.

We hope that through this annual ISET conference, there will be a stronger bond amongst academics, especially those with the expertise of Science, Technology, and Education. I wish you a wonderful conference.

Prof. Dr. Agus Nuryatin, M. Hum

The Director of the Postgraduate Program Semarang State University



Schedule

The 8th International Conference on Science, Education, and Technology Igniting Cutting-Edge Innovations in Science, Technology, Humanities for Sustainable Future

Saturday, 15 October 2022

Time	Activities	PIC
07.45 - 08.00	Registration & Video Playback	IT Team
		Meldy & team
		77.1
		Video
		UNNES Graduate School Profile
		 UNNES profile
08.00 - 08.10	Opening ceremony	IT Team
	Singing a national anthem	Meldy & team
	"Indonesia Raya"	MC
		Martinda Intan
	Prayers	MC
		Martinda Intan
08.10 - 08.20	Traditional Dance Performance	Coordinator
	"Manggar Mayang"	Dr. Agus Cahyono, M.Hum.
08.20 - 08.30	Organizing Committee Report	ISET Chairperson
		Yuli Kurniawati Sugiyo Pranoto
08.30 - 08.40	Opening remarks by Director of	Director of Graduate School
	Graduate School of UNNES	Prof. Dr. Agus Nuryatin, M.Hum.
08.40 - 08.45	Signing of Implementation of	MC: Martinda Intan
	Arrangement	Prof. Dr. Agus Nuryatin, M.Hum.
		Prof. Dr. Tanya Fitzgerald, Ph.D.,
		Prof. Sue Grieshaber, Ph.D., Dr. Rahila Umer Sumalani., Prof.
		Dr. Ooi Boon Seng.
08.45 - 09.05	Keynote Speaker	IT Team
	Rector Universitas Negeri Semarang	Meldy & team
	Prof. Dr. Fathur Rokhman, M. Hum	
	Plen	
	Prof. Dr. Tanya Fitzgerald, Ph.D.,	
09.05 - 09.25	Prof. Dr. Tanya Fitzgerald, Ph.D., University of Western Australia,	IT Team
	Australia	Meldy & team
09.25 - 09.45 09.45 - 10.15	Prof. Sue Grieshaber, Ph.D., La	
	Trobe University, Australia	Moderator
	Q&A	Zulfa Sakhiyya, S.Pd. M.Tesol, Ph.D

10.15 - 10.25	Token of Appreciation	IT Team Meldy & team MC		
Martinda Intan Plenary Session 2				
10.25 - 10.45	Dr. Rahila Umer Sumalani, BUITEMS, Pakistan	IT Team Meldy & team		
10.45 - 11.05	Prof. Dr. Ooi Boon Seng, University Sains Malaysia, Malaysia			
11.05 - 11.25	Prof Rudi., Universitas Negeri Semarang, Indonesia	Moderator Sri Kadarwati, PhD		
11.25 - 11.55	Q&A			
11.55 - 12.05	Token of Appreciation	IT Team Meldy & team MC Martinda Intan		
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Unpacking Students' Metacognitive Experiences in Writing Course: The Effects of Strategy Instruction

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Abstract. Recently there has been a number of consideration research on metacognition. However, little attention has drawn to metacognitive experiences especially in writing enterprises. In view of this, the present study investigated students' metacognitive experiences gathered from their writing in English as a foreign language (EFL) course. A set of semi-structured interview was used as the database to , first, explain students' judgments and feelings related to their mental effort, confidence, satisfaction, and task difficulty before, during, and after their cognitive process in writing and, secondly, the relations of students' metacognitive experiences and their writing performance were also assessed. To this end, 10 voluntory students who have participated in the learning of writing course have been recruited to take part on the interview. A series of questions were given to the participants related to the metacognitive experiences that comprise metacognitive knowledge and metacognitive strategies they run while learning writing. The outcomes of the study showed that students had varied problems solving strategies reflected from the different individual's control of the cognitive regulation. The findings also indicated that there were positive outcomes in favor of the metacognitive strategies used in the writing course particularly when the strategies were correlated to the manifestation of the metacognitive knowledge. This study has practical implications on the prominent of metacognitive experiences that can be activated in writing instructions to support learning achievement.

Key words: metacognitive experiences; metacognitive knowledge; metacognitive strategies; strategy instruction

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INTRODUCTION

Undoubtedly, metacognitive skill has shown as one of learning strategy that enables learners to quality- control the learning and then achieve their goals of learning at the end. Thereby, A number of research has proven the positive outcomes of the work of metacognition in helping students improve the learning (Devine, 1993; Mihalca et al., 2017; Teng et al., 2021). This skill helps individuals understand their learning processes and direct them to be an effective learner or reach higher learning achievement (Stanton et al., 2021). Due to the process of thinking about learning and knowing about tsk processing the characteristics metacognition, this executive skill appeals learners to develop the critical thinking skill, problem- solving skill and decision making skill in their learning processes (Flavel, 1979). For the sake of language learning success, metacognition is regarded as a crucial determinant as according to Flavel's (1976), the learners' knowledge concerning to the cognitive processes and products can be used by the learners to monitor, regulate, and develop their cognitive processes. For this reason, Zhang et al. (2019) mentioned that metacognition plays a pivotal role in language learning instruction.

John Flavel (1979) was considered as the pioneer of the term metacognition in education field. He defined metacognition as the ability of learners understand the cognitive functions and then monitor their own cognition and finally able to control and adjust their cognitive process according to their needs. Allen and Armour (1993) supported the metacognition definition as the knowledge and control of individuals over their own learning experiences and cognitive process. In short, metacognition is the individuals' knowledge on the cognitive process and how to apply the knowledge to achieve the goals of learning (Pitenoee & Ardestani, 2017). Cognition deals with how learners come with problem solving, while metacognition involves the learners' understanding of the process on how the problem is solved (King, 2004). From this understanding, it is clear that metacognition is part of cognition in terms of learners' capacity, strategies, or knowledge that monitor and control their own learning process.

The subcategories of metacognition falls into three components, namely, metacognitive knowledge, metacognitive experiences, and metacognitive strategies (Flavel, 1979; Anderson, 2003; Zhang & Zhang, 2018). It is hard to make

definite distinction among the three components, metacognitive however the knowledge, metacognitive experiences, and metacognitive strategies are complement and enrich one another (Teng et al., 2021) in which metacognitive knowledge influences the metacognitive experiences and then the use of boost metacognitive strategies (Papaleontiou-Louca, 2008). According to this view, a learner has learning experiences based on metacognitive knowledge (ie. If a learner know what is harder or easier to do) and then metacognitive strategies are possible revealed or emerged to achieving a certain aims. To this regard, metacognitive experiences according to Hertzog and Dixon (1994) differ from metacognitive knowledge and from metacognitive strategies.

Metacognitive experiences are considered a new concept for research in this recent time. Consequently, little attention has been given to the work of metacognitive experiences in educational study (Sun et al., 2021). Beforehand, the concept was introduced by Flavel (1979) thereafter the definition was developed by Efklides (2002) in terms of metacognitive experiences framework that encompasses ideas, feelings, judgements, and online metacognitive knowledge in problem solving process. Metacognitive experiences are manifestations of the online monitoring of cognition when the person comes across a task and processes the information related to it (Efklides, 2001). Metacognitive experiences monitor the progress being made towards one's learning goals. Specifically, metacognitive experiences monitor the outcome of processing the information in an affective or a cognitive manner- namely, namely feelings and metacognitive metacognitive judgements. Examples of metacognitive feelings that may convey information about one's competence are feeling of difficulty, feeling of confidence, and feeling of satisfaction. Whereas metacognitive judgments associated with feeling of difficulty are estimate of effort expenditure, and estimate of solutions or correctness (Efklides, 2001). In this regard, metacognitive experiences are paramount to make a learner aware of the fluency of the cognitive processing and of the match or mismatch between the goal set and the outcome achieved (Frijda, 1986). Teng et al. (2002) and Sun et al. (2021) posit that metacognitive experiences are significant in writing process as they are correlated with metacognitive knowledge and metacognitive strategies. Regarding this view, metacognitive experiences may launch the revision of the metacognitive knowledge and metacognitive strategies during the cognitive endevour (Papaleonteous-Louca, 2008)

There has been greatly growing studies on metacognition, however they have mostly focused on the cognitive aspects, like task processing and monitoring and regulation of processing the content (Simons et al., 2020; Cer, 2019; Panahandeh & Asl, 2014), and metacognition on some specific domains, such as in science (e.g., Ben-David & Orion, 2013), reading (e.g., Yuksel & Yuksel, 2012), and listening (e.g., Birjandi & Hossein, 2012). Additionally, lots of further researches have also investigated metacognitive knowledge and metacognitive learning strategies (i.e., Riwayatiningsih et al., 2021; Simons et al., 2020; Cer, 2019). Nonetheless, little attention has been paid to the aspect of metacognitive experiences, particularly in EFL writing study that is ascertained from before writing, while writing process, and after completing the writing.

To address this gap, this study focuses on a particular aspect of metacognition, that is on exploring metacognitive experiences situated in EFL writing course. Its emphasis was on metacognitive feelings and metacognitive judgements that are present in learnig situation such as problem solving in text processing on activity. The multi-dimensional challenges in writing are acknowledged by the lack of awareness and writing strategies usage (Ruan, 2014; Teng, 2019). Therefore, treating students with strategy instruction may help them in their writing performances (Naghdipour, 2016; Machili et al., 2019). Strategy instruction may help students equip with the skills required to become good learners. Webster (2019), for example, investigated how strategy instruction was introduced to facilitate more effective language learning strategy to meet students' learning needs. The design of strategy instruction used the five stages model of strategy instruction adapted from Oxford's (2011). Biwer et al. (2020) has also investigated on strategy instruction through intervention program in higher education on practice testing. The results suggested the positive effects on knowledge about effective learning strategy to overcome difficulties during learning. On that account, the role of strategy instruction through metacognition is as determinant for language learning success (Rahimi & Katal, 2012; Ghapanchi & Taheryan, 2012; Nguyen & Phung, 2021).

Critical thinking and problem solving skills have also been prominent attention in academic writing. The ability to infer the reasonable judgments and decision are taken from the representation of metacognitive process which entail critical thinking and problem solving skills (Dywer, 2004). In the process of writing, a writer needs to make decisions for not only on ideas and content but also grammatical structures and other linguistic features (Fareed et al., 2016; Mohammad et al., 2017). Those reasons eventually make the complexity of writing skill (Schleppegrell, 2012; Derewianka, 2015; Gillet, 2017). In addition, the ability of activating the cognitive, linguistics, and background knowledge of the issue (Cigademoglu et al., 2017) together with generating sentences and paragraph in a good composition (Kazemian et al., 2021) make writing becomes a complex process. An effective writer must produce a text which is cohesive, logical, clearly structured, interesting, and properly organized with a wide range of words choices and mastery of conventions of mechanics (Jacobs & L, 1981). As Nunan (1989) argues that writing is an extremely difficult cognitive activity which requires the learner to have learning strategy intervention. For this metacognition experiences may foster awareness in the writing process and has added as the suggested strategy to the development of strong writers in the classroom (Chaterdon, 2019; Cakici, 2018; Kallio et al., 218; Azizi & Estahbanati, 2017).

Researchers have admitted that complexity, accuracy, and fluency were significant in foreign language writing (Barrot & Agdeppa, 2021). From that three terms, complexity in writing refers to the students' experiences dealing with the wide range of grammatical forms and structures in language development (Pallotti, 2015). While the outcome of accuracy is associated with students' competency in the grammatical correctness while writing (Foster & Wigglesworth, 2016; Skehan, 2009). Concerning with the presentation of fluency, this performance relates to students' natural flow and rhythm in producing written words (Abdel Latif, 2013; Ellis Barkhuizen, 2005). These writing performances can be initiated through appropriate pedagogical interventions in the writing classroom (Kiken et al., 2010; Wigglesworth & Storch, 2009). By providing metacognitive writing experiences for students, the production of more complex, accurate, and fluent written production is expected impose the language development. In particular, helping students in writing experiences are enabling them to develop the quality of writing. Therefore, it is crucial to conduct study on students' metacognitive experiences in writing to potray the strategy instruction for the language achievement.

This study makes several contribution. First, it will provide meaningful implications for EFL writing pedagogy and research. Secondly, it will also help writing teachers in gaining a more nuanced understanding of metacognition for language learning proficiency which eventually such awareness can guide them in pedagogical interventions based on evidence. theoretically, the findings will contribute to inform researchers on how metacognitive experiences as the determinant facet of metacognitive knowledge can be considered when examine the learning situations such as in text processing.

METHODS

Research design

This qualitative study was designed to describe the metacognitive experiences which metacognitive judgements metacognitive feelings from 10 higher education students who have participated in multifaceted nature of EFL writing course from a private university in Indonesia. Students' metacognitive judgements and metacognitive feelings were also identified related to their writing performance. The data were collected via interviews which were transcribed and then interpreted through a thematic analysis approach. The research design involved developing an interview based on literature analysis from the facets metacognitive experiences from Efklides (2005). The analysis of the data was done by adopting the interactive model by Miles and Huberman (1994)

Participants

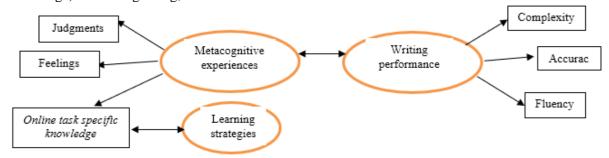
10 students were recruited for the sampling participants (6 girls and 4 boys) and their average age was 19. The participants were second year undergraduate students who take academic writing course at university of Nusantara PGRI Kediri. This university was included a private one that involves the students to pay the tuition fee every year. This mechanism makes a difference in part of the social- economic status between students who studied in the state university. Concurrently, the writing course was designed to improve writing performance by administering strategy instruction. This was noticeable from the

instructional design made by the lecturer. The initiated participants were selected because their score in writing were in A level which it indicates the excellent performance for the learning achievement. Moreover, this also means that the students had success in pertaining the writing instruction.

Procedures

The enlisted participants were invited for an hour in-depth interview using semi- structured questions on metacognitive experiences (Judgments, feelings, and the online task specific knowledge). In the beginning, the researcher sent

a consent form to the participants to assured that they all have agreed to contribute to this research. In the interview process, they were investigated about their metacognitive experiences, such as (1) their judgments of; learning, estimation of effort, and estimation of time, (2) their feelings of; familiarity, difficulty, understanding, confidence, and satisfaction, and (3) their online task specific knowledge; task features and procedures employed. The questions of the interview were addressed to instigate the writing performance measurement (complex, accurate, and fluent written texts).



The interview was conducted participants first language, just after the participants completed writing activity. Each participants was asked to respond in the semistructured interviews items category metacognitive feelings and metacognitive judgments refer to their writing exertion. The process of the interview, which lasted in an hour was recorded and transcribed in the verbatim model. The data obtained from the interview were then translated into English, and to assure its reliability and validity, the researcher confirmed the translation results to a translator, who is also a lecturer in the university. In anticipation of missing information during an interview session or having problems with the recording process, the researcher had prepared the plan to reinterviewed the participants to ensure internal data consistency.

Subsequent to the analysis of the data, Miles and Huberman's (1994) data analysis was used to come with the data reduction, data display, and conclusion. In the end, the results of the interview transcripts were classified into metacognitive feelings and metacognitive judgments as part of the metacognitive experiences.

RESULTS AND DISCUSSION

Students' metacognitive feelings on writing In the metacognitive feelings of confidence category on writing process, the students' feelings are depicted from the following excerpts:

Excerpt 1:

"It is easy for me to develop the ideas from the topic because I do several reading activity on related topic before I start to write." (Student A) Excerpt 2:

"I understand what I should write if the topics related to my daily lives." (Student B) Excerpt 3:

"I believe the more I read the more I can write and I feel comfortable with the topics presented to my daily activities." (Student C)

The three successful student writers declared that they feel confident in writing, especially topics related to their reading and daily activities (student A, B, and C). These feeling of confidence denoted that they were able to recall their prior knowledge (cognitive and metacognitive strategies) while writing. These kind of feelings were a result of the aptitude in reaching the cognitive goals. This discovery was in line with (Efklides, 2001, 2006)'s finding that feeling of confidence was related to the learners' interest and feeling of liking on a task after they had finished working on it with the positive mood. The positive affect made the learners ease in the effort of exertion the task, thus this engagement supported in the future similar tasks. The students' positive metacognitive feelings of confidence decoded their use of metacognitive

of problem solving. These decisions were then successful student writers, less successful student structures the outcome of processing, the estimate of excerpt: correctness and feeling of difficulty. For instance, two of the less unsuccessful student writer contended that:

Excerpt 4

"I do not have good writing ability and this task makes me difficult. I am aware that I lack of experiences in writing, so I need to write more." (Student D)

Excerpt 5

"I feel hard to write complicated sentences, so I develop the simple forms and structures." (Student E)

in writing, the less successful student writers had monitoring, and evaluation of cognitive goals. negative feelings affected from the lack of fluency. This process was apparent when students worked This was due to the interruption of processing with revision activity for word-level clarity in within their cognitive goals. In the interview, the order to find words that best express their ideas. participants shared their feelings of difficulty in the Another presentation of this metacognitive task demand as shown from excerpt 4 and 5, and at judgments was observed through students' the same time they developed more effort to task activities to monitor the organization of the processing. Their feeling of difficulties were informations they have gathered in outline in the product of monitoring the cognitive process and order of importance. had the quality of unpleasant feelings. Therefore, the student writers who were aware of their feelings occurance was apparent when students were of difficulties denote their negative effect of attentive to the time needed or used. These processing and tried ways of solution in order to get exertions might be attributed from the in the fluency of processing. This attribution to the examination culture in their learning context that task complexity or lack of personal competence, they habituated in school learning circumstances. called the students to proceed with the planning of For that reason, students appertain to decide the the process or with the use of strategies in learning. right time in order to get effective learning This findings have flourished the existing studies enterprise. This level of judgments is related to on emotions in the field of language learning the execution of responses that it would increase research (e.g., Kasper, 1997; Zhang, 2002; Wu, the confidence when students launched the task in 2006; Davari et al., 2020). The findings suggested shorter time. that the feeling of difficulty is associated with the feeling of confidence. Thus, it also supported on online task- specific knowledge which were Koriat and Levi's (1999) findings that the evidence noticed from students' initial use of words and of metacognitive feelings of difficulty were caused by lack of understanding the task demand or related to students' spontaneous awareness of procedural knowledge during processing.

knowledge in order to make control the decisions Students' metacognitive judgments on writing

In another category metacognitive of implemented through metacognitive strategies. It experiences was metacognitive judgments. The was apparent from the above extracts that reading judgments of student writers estimated their effort was the strategy to make students felt confident in of expenditure in the process of writing regarding articulation of ideas in their writing. Unlike the with the vocabulary use, grammar use, sentence and organization. These writers contended that they do not feel confident components have been considered as the pertinent in good ability in writing. They were also unable of the dimensions of complexity, accuracy, and to recall their prior knowledge in their writing fluency in writing performance. The students' process as they were lacking the writing metacognitive judgement estimates their (1) effort experiences. This kind of feeling was related to in writing performance, such as in the following

Excerpt 5

"I pay attention to words choices used in my writing." (Student F)

Excerpt 6

"I ask my self if my writing matches with the instruction." (Student G)

The above excerpt indicated that the students tried to estimate the effort of exertion in writing process relating with vocabulary use, grammar use, sentence structure, and organization. The allocation of this effort guided them with deliberation use of strategies for regulating In terms of metacognitive feelings of difficulty learning that involved process in planning,

(2) the effort in calculating the time. This

Another metacognitive judgments were based ideas or thought in writing. This performance is task and strategies during writing process. The

example of this exertion is shown from the excerpt below:

Excerpt 7

"I make necessary modifications from my plan while writing." (Student H)

Excerpt 8

"I pause while writing and ask my self if the message is clear." (Student I) Excerpt 9

"While writing, I ask myself if the vocabulary and grammar are appropriate. '(Student J)

The excerpt above revealed that students' judgements related to their own knowledge of cognition process in writing have guided them to set strategies during the monitoring phases. The illustration of the judgments can be described that students use their understanding how they proceed the task and adjust the strategies used as it needed.

The results of the study showed that learners' metacognitive feelings and judgments of estimates were significantly correlated with their writing scores. Students who have intense metacognitive experiences tend to perfom better learning to write. The orchestration of metacognitive knowledge has directed them in the proficiency level of the writing performance.

CONCLUSION

Taken together, this study attempts to explicate Efklides, A. (2006). Metacognition and Affect: students' metacognitive experiences on writing process concerning with complexity, accuracy, and fluency. The results from the interview showed the role of metacognitive experiences in explaining the association between metacognitive knowledge and Efklides, A. (2008). Metacognition: Defining Its the learning strategies used. Findings from data analysis demonstrated that students' metacognitive knowledge played as the predictive factors to reach learning strategies for their performance, and that association was mediated by experiences. metacognitive From students' statements relating to metacognitive feelings, Flavell, J. H. (1976). "Metacognitive Aspects of metacognitive judgments, and online metacognitive knowledge on writing revealed presentation of their writing performance.

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