Students' Profiles in the Perspectives of Academic Writing Growth Mindsets, Self-Efficacy, and Metacognition

Djatmika
Universitas Sebelas Maret, Indonesia, *djatmika@staff.uns.ac.id*

Lastika Ary Prihandoko
Corresponding author, Universitas Sebelas Maret, Faculty of Economic and Business, Indonesia, *prihandoko@staff.uns.ac.id*

Joko Nurkamto
Universitas Sebelas Maret, Indonesia, *jokonurkamto@gmail.com*

It has been a consensus that growth mindsets, self-efficacy, and metacognition have played their respective roles in academic writing. However, very few previous studies have investigated the contributions of those variables all together in single studies. Thus, the present study aimed to examine the interplay among academic writing growth mindsets, self-efficacy, and metacognition concomitantly as a single study by formulating seven hypotheses. Using partial least squares structural equation modelling (PLS-SEM), this quantitative study conveniently involved 464 undergraduate students from several majors, working with undergraduate theses. They were the students from four state universities and two private universities in Central Java and Papua, Indonesia. A valid and reliable questionnaire negotiating academic writing growth mindsets, self-efficacy, and metacognition was copied into the Google form, and the links were distributed to the respondents. Results demonstrated that, in the academic writing context, positive and significant relationships were encountered between growth mindsets and ideation self-efficacy, growth mindsets and convention self-efficacy, growth mindsets and self-regulation self-efficacy, ideation self-efficacy and convention self-efficacy, ideation self-efficacy and self-regulation self-efficacy, convention self-efficacy and self-regulation self-efficacy, and self-regulation self-efficacy and metacognition. Self-regulation self-efficacy mediated the correlation between growth mindsets and metacognition. Future's studies are expected to develop a structural model of academic writing factors by incorporating the other influential variable, e.g. critical thinking skills, because it might contribute to differences in academic writing skills.

Keywords: undergraduate thesis, academic writing, growth mindsets, self-efficacy, metacognition

INTRODUCTION

In general, academic writing conceptually depicts a form of interactive communication between a writer and readers, in which the writer addresses an issue in detail and in a scientific way with the aim of providing the readers with credible information (Çandarl et al., 2015). On the writer's side, academic writing encompasses rational and intellectual activities in terms of processing and transferring knowledge. Those processes are complex in nature due to the consecutive works on idea brainstorming, planning, drawing the conceptual framework of what to write out, writing a draft, proofreading, and making revisions (Csizér & Tankó, 2017). At the tertiary level, among undergraduate students, academic writing is generally affiliated with research-based writing or the so-called thesis writing, which is the last phase they have to pass to receive their bachelor's degrees (Weaver et al., 2016). Wu et al. (2017) delineated that there are six major steps the undergraduate students take in writing theses. The first is to select the orientation of the research area by engaging supervisors in discussions to decide on the fixed area of research. The second is to determine the research's topic. The third is to review relevant literature and conduct the research project. The fourth is to write out the initial drafts of theses. The fifth is to make revisions and finalize the works. The sixth is to take thesis exams. Each stage of research-based academic writing has its own complexities (Huerta et al., 2016). Oftentimes, students face difficulties due to insufficient knowledge about the styles of academic writing and because of ineffective compositions in the domains of both idea organizations and language structures (Zaki & Yunus, 2015). Also, the processes of data presentation and discussions very often trap students in rumination. Hence, the persistence of students' prolonged and active engagement in dealing with all stages of academic writing alongside their detailed contents is of importance (Altınmakas & Bayyurt, 2019). Guraya and Guraya (2017) added that the levels of students' academic writing skills and their understanding of research ethics also determine their qualities and success in academic writing.

Learning from prior studies, there could be identified some external factors in the form of tutors' or supervisors' interventions which contribute to the enhancement of students' academic writing skills. A study executed by Adamson et al. (2019) demonstrated the importance of supervisors' roles in helping students write out academic works (in this case, undergraduate, graduate, and postgraduate theses). Their study informed that the supervisors' roles such as scaffolding students, holding continuous discussions with students to help them deal with English and non-English resources, providing corrective and metalinguistic feedback in a direct way, and assisting students in mapping their concepts become critical factors that support students' success in academic writing. The study undertaken by Kuiken and Vedder (2020) echoed that the provision of a remedial program to intensively train students whose academic writing proficiency has not reached the expected standards is contributive towards the advancement of their academic writing skills. In respect of helping students organize their ideas for writing, Miller and Pessoa (2016) recommended that students be taught explicitly. Subsequently, the study conducted by Suen (2021) portrayed that a research-based academic writing workshop is contributive to the increase in students' academic writing skills, wherein

their participants could perceive the extent to which academic writing knowledge and skills are transferrable.

Besides external factors, the complex nature of academic writing which entails logical and critical processes of ideational and language use-related organizations also calls for students' strong internal factors such as growth mindsets, self-efficacy, and metacognition (Bai et al., 2020; Negretti & McGrath, 2018; Vincent et al., 2021). First, a growth mindset refers to the belief that intelligence can be forged and improved through efforts. A study conducted by Truax (2018) indicated that the inclusion of a growth mindset in teacher's feedback alongside the provision of truth-based compliments contributes to an increase in students' writing motivation. Second, self-efficacy is part of a person's motivational dimension, and it represents a person's belief in his own ability to produce or achieve the desired results from the hard work he invests (Mitchell et al., 2021). Studies conducted by Vincent et al. (2021) portrayed that increasing confidence in ones' abilities or self-efficacy to write in certain situations is thus regarded as an important effort to improve their writing performance. Third, metacognition is defined as students' awareness of their own thinking processes, in which they are able to reflect on their knowledge and the processes of controlling their own cognitive or thinking activities effectively to achieve the expected learning goals (Karlen, 2017). Metacognition, as a higher-order cognitive process, is an important factor that influences writing outcomes because it trains students to develop specific strategies required to deal with each component of writing (Pitenoee & Modaberi, 2017).

Since the last five years, prior studies on writing, which worked on the variables of growth mindsets, self-efficacy, and metacognition, have been conducted, and such studies have been very contributive to us and provided us with adequate knowledge and data about the aforementioned three variables' roles in writing. Nonetheless, those studies seem to have addressed the three variables as single variables in respective studies (Grenner et al., 2021; Howe & Wig, 2017); they have examined the interrelationships of mere two out of the three variables (Colognesi et al., 2020; Vincent et al., 2021); or they have scrutinized the interrelatedness of respective three variables with other variables (Chakma et al., 2021; Puryantoa et al., 2021). However, to the best of our knowledge, no prior studies have been oriented towards conducting an exploratory analysis of the interplay among academic writing growth mindsets, self-efficacy, and metacognition in the context of undergraduate thesis writing as a single study. Also, no previous studies with the foregoing aim could have been traced from the publications of Indonesian academicians thus far. Thus, the present study seeks to fulfil this literature's void by conducting an exploratory analysis of the interplay among academic writing growth mindsets, self-efficacy, and metacognition in the context of tertiary students from Indonesian population who are dealing with undergraduate thesis writing. As the foregoing, the main objective of this study is to examine the interplay among academic writing growth mindsets, self-efficacy, and metacognition concomitantly. The following presentation provides theoretical reviews related to the present study's variables to formulate the hypotheses underlying the aforesaid main objective.

Growth Mindset

One of the factors impeding the development of students' writing skills is the so-called fixed mindset. Such a mindset does not allow students to take account of their conceivable potential to boost their writing competencies to a higher level. Students should realize the nature of a mindset as something fluid in which it can be constructed and co-constructed to help motivate them to reach their ideal writing skills. Truax (2018) asserted that a mindset is flexible in a way that it can change and be controlled as desirable, thus students can opt to have a growth mindset in a certain realm to reach their ideal mastery. To be defined, a growth mindset refers to the belief that intelligence can be forged and improved through efforts, and it is a significant predictor of the use of general learning strategies (Blackwell et al., 2007). Students' growth mindsets can be a motivational factor for their learning development in light of that their growth mindsets will lead them to being more confident in learning after they review their latest learning outcomes. The essence of growth mindsets is critical to writing because the complexity of writing processes (e.g. planning, drafting, proofreading, and revising) will cause students to be vulnerable to give up if they find it difficult to work on those writing steps. With a growth mindset, students will see wisely the complex processes of writing as the stages of learning they have to take part in. Learning from a study conducted by Truax (2018), students' growth mindsets can be enhanced by teachers' motivational talk and written feedback. Furthermore, once students have growth mindsets, they can invest their self-regulated learning efforts to reach better writing skills (Bai et al., 2020).

Self-Efficacy

Self-efficacy is the primary motivating factor for students, and it is an indicator that supports students' involvement in learning (Hwang, 2020). In terms of writing, different approaches to students' written works may be based on their diverse levels of self-efficacy or confidence in their abilities to work on the papers (Callinan et al., 2018). Writing self-efficacy is defined as anything inherent in writers' beliefs about their ability to write, such as abilities that require multiple skills, strategies, and knowledge in a specific context (Mitchell, Harrigan, Stefansson, et al., 2017). Increasing confidence in ones' abilities or self-efficacy to write in certain situations is thus regarded as an important effort to improve their writing performance (Vincent et al., 2021). Bruning et al. (2013) posited three constructs of self-efficacy for writing which fall into ideation, convention, and self-regulation. The first depicts self-efficacy in terms of creating and shaping the concepts, principles, and reasoning that serve as the foundation for writing. The second demonstrates self-efficacy in terms of improving linguistic skills, such as when writers express their ideas using words, syntactic structures, and the organization of language discourse. The third represents the writer's self-efficacy in terms of self-management and affective control, and this self-efficacy includes assessments of the cognitive and linguistic features of the writing produced. According to research, affective or motivational factors such as self-efficacy are strongly related to improving writing skills (Sabti et al., 2019). A study conducted by Han and Hiver (2018) also supports the same condition.

Metacognition

Metacognition is students' awareness of their own thinking processes (Hastuti et al., 2020; Wafubwa & Csíkos, 2020), in which they are able to reflect on their knowledge, and the processes of controlling their own cognitive or thinking activities effectively to achieve the expected learning goals (Warsah et al., 2021). Metacognition serves as a problem-solving strategy for students when writing (Briesmaster, 2017). From a cognitive standpoint, writing is viewed as a complex recursive process that includes interactive stages of planning, designing an outline, producing a written product, and revising a written product. All of these processes are related to students' conscious control over activities such as planning, monitoring, assessing, and self-regulating. Metacognition, as a higher-order cognitive process, is an important factor that influences writing outcomes because it trains students to develop specific strategies required to deal with each component of writing (Pitenoee & Modaberi, 2017). Learners with good metacognition will be able to build effective interactions, critical arguments, and rationalize their arguments. The aforesaid competencies are important components in writing (Teng, 2019). Furthermore, metacognition assists students in planning, monitoring, and evaluating their written work independently (Teng, 2019). Escorcia and Ros (2019) explained that when students are good at applying metacognitive strategies, they will be able to create written products that are based on readers' expectations, both in terms of genre targets and the flow of written contents. They will also be aware of the various characteristics and ideational structures of good writing (Aliyu et al., 2016).

Theoretical Interrelationships among Growth Mindset, Self-Efficacy, and Metacognition

Many studies in the different realms of academic writing have demonstrated the interrelatedness among growth mindset, self-efficacy, and metacognition. Reflected on a study conducted by Zander et al. (2018), people with growth mindsets likely have a higher level of self-efficacy. In the context of learning, the foregoing premise is supported by Rhew et al. (2018) as they explained that students with growth mindsets will perceive their learning experiences and the given feedback as the sources to learn better and to advance the expected outcomes of their learning trajectories. Hass et al. (2016) suggested that the constructs of growth mindsets and those of self-efficacy have been correlative in nature, thus they proposed that the measurement of growth mindsets as a study's variable should directly incorporate the theoretical indicators of self-efficacy. Subsequently, the studies conducted by Hayat et al. (2020) and Oyelekan et al. (2019) demonstrated the correlation between self-efficacy and metacognition. Furthermore, a study conducted by Bai and Wang (2020) showcased that a motivational variable, such as a growth mindset, has also been proven to strongly predict self-regulated learning whose theoretical constructs exist in the same dimension of metacognition. The foregoing relationship has been explained by the implicit theory of intelligence, in which ones whose mindsets are fluid, in a way that they put their trust in their capabilities to make more learning efforts, become more competent at metacognition or metacognitive strategies (Yeager & Dweck, 2012).

The theoretical interplay among growth mindsets, self-efficacy, and metacognition as portrayed above enables us to formulate some hypotheses to examine the interrelationships of those variables in our study's context, namely undergraduate thesis academic writing. So far, no prior research has been conducted to scrutinize the complete interrelationships among the variables of growth mindsets, self-efficacy, and metacognition in the field of undergraduate thesis academic writing as a single study. To formulate detailed hypotheses, we follow Yeager and Dweck's (2012) explanations that the variable of academic writing self-efficacy falls into three sub-variables, namely self-efficacy for ideation, convention, and self-regulation. Hence, we seek to conduct an exploratory analysis by proposing the following hypotheses: H1: Academic writing growth mindsets correlate with self-efficacy for academic writing ideation; H2: Academic writing growth mindsets have a relationship with self-efficacy for academic writing convention; H3: Academic writing growth mindsets correlate with self-efficacy for academic writing self-regulation; H4: Self-efficacy for academic writing ideation has a relationship with self-efficacy for academic writing convention; H5: Self-efficacy for academic writing ideation correlates with self-efficacy for academic writing self-regulation; H6: Self-efficacy for academic writing convention has a relationship with self-efficacy for academic writing self-regulation; and H7: Self-efficacy for academic writing regulation correlates with academic writing metacognition.

METHOD

The current study sought to conduct an exploratory analysis of academic writing growth mindsets, self-efficacy, and metacognitions by examining seven hypotheses already formulated. The conceptual model grounded in the formulated hypotheses can be seen in figure 1.
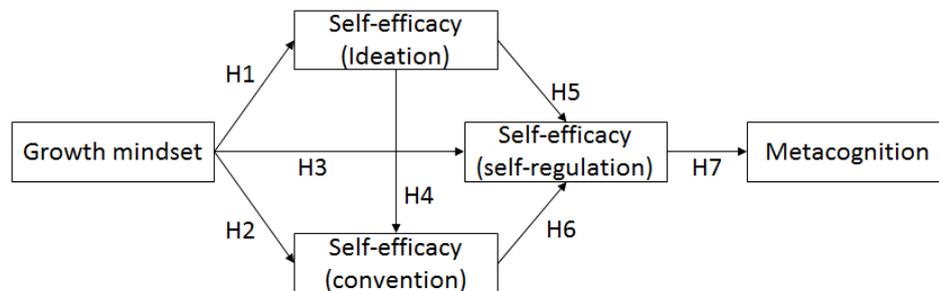

Figure 1
Conceptual model

Respondents and Data Collection

This study employed a purposive sampling technique by targeting a population of 500 undergraduate students. The purposive sampling criterion was central to the students who were writing undergraduate theses during the COVID-19 pandemic. The targeted respondents were the students from several departments at various universities in the provinces of Central Java and Papua, Indonesia. From the province of Central Java,

there were four state universities and two private universities involved. In the province of Papua, there were two state universities incorporated. Out of their population, the student respondents were selected by distributing the links of online questionnaire copied to the Google form. In so doing, the heads of each department, where the student respondents studied, helped us to distribute the questionnaire's links to the student respondents. Based on the distributed online questionnaire, we obtained responses from 464 students. Table 1 displays the demographic data of the student respondents.

Table 1
Demographic information

		Number	%
Gender	Male	83	17.9
	Female	381	82.1
Age	18 years	1	0.2
	19 years	10	2.2
	20 years	28	6
	21 years	105	22.6
	22 years	184	39.7
	>22 years	134	28.9
Academic fields	Literature	220	47.4
	Education	241	52.6
Time spent on the social media (on a daily basis)	< 1 hour	50	10.8
	1-2 hours	71	15.3
	2-3 hours	75	16.2
	3-4 hours	89	19.2
	> 4 hours	179	38.6
Time spent to read a book or research article (on a daily basis)	< 1 hour	134	28.9
	1-2 hours	189	40.7
	2-3 hours	90	19.4
	3-4 hours	39	8.4
	> 4 hours	12	2.6
Time spent to use notebook/ laptop (on a daily basis)	< 1 hour	48	10.3
	1-2 hours	111	23.9
	2-3 hours	82	17.7
	3-4 hours	89	19.2
	> 4 hours	134	28.9

The demographic data in Table 1 showed the characteristics of student respondents. In this study, there were 464 student respondents consisting of 83 males and 381 females. They aged from 19 to more than 22 years old. In respect of the existing context, it was worth noting that there were a few students who aged 18, 19, and 20 years old, in which they were quite younger than general students who wrote theses. After contextual investigations, we found out that those young students were the accelerated ones when they took high schools, so they were still at such young ages when we met them for data collection. Regarding academic fields, the students engaged in this study were those of literature and education majors. This was limited by our capabilities and collegiate links to get official permissions to access students in other fields. As the lecturers of literature

and education, on the on-going discourse, we could only receive official permissions from the institutions to access students from literature and education majors. We also explored other demographic components related to their daily activities in accessing social media, reading books or research articles, and time spent using laptops or notebooks. As displayed in table 1, the ratio of daily time spent by the student respondents to access social media was proven to be more than the time spent for reading books or research articles.

Measures

We used an instrument in the form of an online questionnaire for data collection. The questionnaire consisted of three parts, namely the independent variable (exogenous), the dependent variable (endogenous), and the demographic variable. One of the exogenous variables incorporated in this study was growth mindsets (GM). The variable, functioned as an endogenous variable alongside an exogenous variable as well, was writing self-efficacy whose constructs comprised self-efficacy for ideation (SEI), self-efficacy for convention (SEC), and self-efficacy for self-regulation (SESR). The variable of writing metacognition (MC) played a role as an endogenous variable. The demographic variable encompassed gender, age, provinces of the universities' origins, daily time spent for reading, and daily time spent for using laptops or netbooks. The total items of the questionnaire were 25 items. In detail, the 25 items represented exogenous and endogenous variables which were measured on an interval scale using a 5-point Likert scale (ranging from strongly disagree to strongly agree). The instrument was a combination of several questionnaires adapted from previous studies conducted by Cooper et al. (2020) for the measure of growth mindsets, Bruning et al. (2013) for the measure of writing self-efficacy, and Karlen (2017) for the measure of writing meta-cognition. The expert validation and pilot testing of the instrument were carried out. In doing so, a couple of linguists were asked to review and revise ambiguous and unclear items. Subsequently, pilot testing was carried out by distributing a prototype questionnaire to 60 students. The piloting results were further analyzed using SPSS 23 to test the reliability and validity. The results of reliability test demonstrated that the score of Cronbach's Alpha was of 0.823, and the Bivarrate Pearson computation assigned to examine the validity resulted in the scores of r in the range from 0.61 to 0.83 with an r table of 0.138. The foregoing showcased that a good reliability score had been achieved, and the validity scores of all items were categorized as valid. The instrument was subsequently distributed online using the Google form.

Data Analysis

This study applied a quantitative approach by deploying the Partial Least Squares Structural Equation Modelling (PLS-SEM) analysis (Hair Jr et al., 2016). The initial assessment was to measure the measurement model's internal consistency. This assessment was conducted with the aim of performing a confirmatory factor analysis (CFA) on the type of reflective model to assess item loadings (Hair Jr et al., 2016), so that the convergent validity could be achieved. The next stage was to assess the discriminant validity using the Heterotrait-Monotrait-Ratio (HTMT) assessment. This stage was taken to ensure that each construct was different from one another. The data

analysis continued to conduct the Collinearity test. This stage was taken to verify whether, or not, there was multicollinearity in the variance inflation factors (VIF). This stage was critical to ensure that there was no multicollinearity because it could have an impact on the reliability and validity of the patch significance test (Kock, 2016). The final stage was to analyze the paths using the bootstrapping analysis to test the formulated hypotheses to find out the interactions among the variables of academic writing growth mindset (GM), self-efficacy for ideation (SEI) self-efficacy for convention (SEC), self-efficacy for self-regulation (SESR), and metacognition (MC). All processes of analysis were aided by the program of Partial Least Squares Structural Equation Modelling (PLS-SEM).

FINDINGS

Internal Consistency Measures for Measurement Model

The initial assessment of the model was conducted with the aim of performing a confirmatory factor analysis (CFA) on the type of reflective model to assess item loadings (Hair Jr et al., 2016). All item loadings of the five constructs (see Figure 1) showed values above 0.5 according to the minimum limit of item loadings (Hair Jr et al., 2016). Item loadings on the growth mindset (GM) construct ranged from 0.657 to 0.823; those of self-efficacy for ideation (SEI) ranged from 0.808 to 0.873; those of self-efficacy for convention (SEC) ranged from 0.798 to 0.841; those of self-efficacy for self-regulation (SESR) ranged from 0.637 to 0.750; and those of metacognition (MC) ranged from 0.708 to 0.761. The implication of this figure demonstrated that the convergent validity had been achieved. The construct validity and reliability can be viewed in table 2.

Table 2
Construct validity and reliability

Construct	Cronbach's Alpha	rho_A	Composite Reliability	AVE
GM	0.733	0.784	0.825	0.543
MC	0.791	0.794	0.857	0.545
SEC	0.759	0.764	0.861	0.674
SEI	0.806	0.812	0.885	0.721
SESR	0.752	0.760	0.834	0.502

GM = Growth Mindset, MC = Metacognition, SEC = Self-efficacy (Convention), SEI = Self-efficacy (Ideation), and SESR = Self-efficacy (Self-regulation)

The next stage in the inner model evaluation was to assess the discriminant validity using the Heterotrait-Monotrait-Ratio (HTMT) assessment to ensure that each construct was different from one another. The recommended threshold explained that the values might not exceed 0.85 (Henseler et al., 2015). The values obtained based on HTMT (see Table 3) showed a range of values from 0.239 to 0.837. The foregoing confirmed that each construct in the model was different from one another. In conclusion, the discriminant validity had been achieved.

Table 3
Heterotrait-Monotrait-Ratio (HTMT)

Construct	GM	MC	SEC	SEI	SESR
GM					
MC	0.663				
SEC	0.424	0.739			
SEI	0.239	0.623	0.837		
SESR	0.501	0.759	0.719	0.561	

GM = Growth Mindset, MC = Metacognition, SEC = Self-efficacy (Convention), SEI = Self-efficacy (Ideation), and SESR = Self-efficacy (Self-regulation)

Multicollinearity

The analysis was further carried out using the Collinearity test to verify whether, or not, there was multicollinearity in the variance inflation factors (VIF). The recommended threshold for VIF might not exceed 3.3 (Hair Jr et al., 2016). The VIF obtained (see Table 4) demonstrated the gains between 1.000 and 1.921 for the five constructs. Accordingly, it could be concluded that, based on the Collinearity test, the resulting model did not have multicollinearity which affected the patches' reliability and validity.

Table 4
Collinearity

Construct	GM	MC	SEC	SEI	SESR
GM			1.046	1.000	1.135
MC					
SEC					1.921
SEI			1.046		1.771
SESR		1.000			

Results of Path Analysis

The final stage of model analysis was the inner model evaluation through the bootstrapping stage with a significance level of 0.05 as shown in the graphical output in Figure 2.
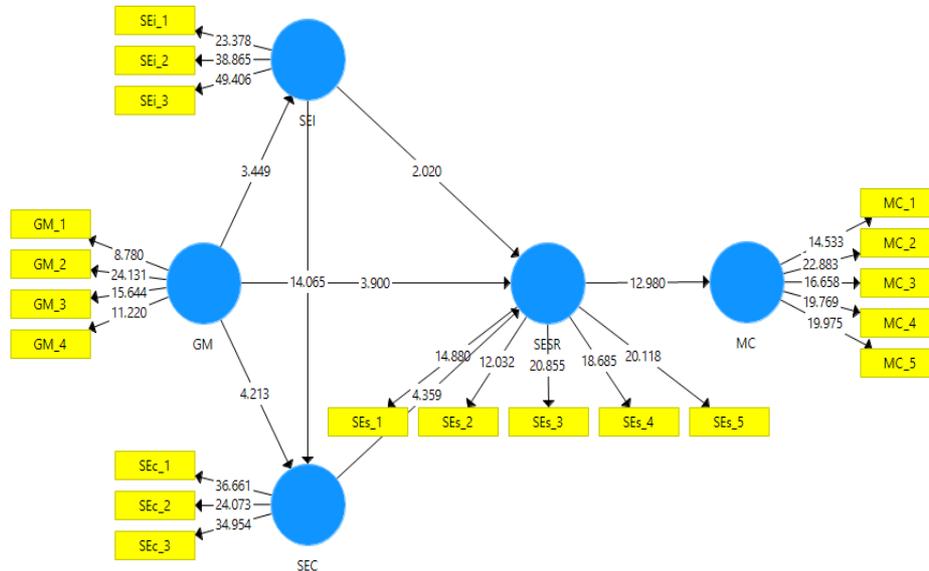
Figure 2
Bootstrap results for path analysis

The analysis used path coefficient/hypotheses examination and effect size determination (Hair Jr et al., 2016). Furthermore, in Table 5, paths analysis showed the standardized path coefficient at the level of a strong positive relationship (+1) (Hair Jr et al., 2016). In addition, the significance level used was 0.05, so that the hypothesis could be accepted with the t-Value criteria of > 1.96 (Wong, 2013). The analysis results showed that all hypotheses were accepted. For example, the relationships between growth mindsets and self-efficacy for ideation, convention, and self-regulation were positively significant as indicated by ($\beta = 0.20$; $p < 0.05$; $t = 3.449$; supporting H1); ($\beta = 0.21$; $p < 0.05$; $t = 4.213$; supporting H2); and ($\beta = 0.23$; $p < 0.05$; $t = 3.900$; supporting H3). Subsequently, the relationships between self-efficacy for ideation and self-efficacy for convention and between self-efficacy for ideation and self-efficacy for self-regulation were positively significant as demonstrated by ($\beta = 0.61$; $p < 0.05$; $t = 14.065$; supporting H4) and ($\beta = 0.15$; $p < 0.05$; $t = 2.020$; supporting H5). Furthermore, the relationship between self-efficacy for convention and self-efficacy for self-regulation was positively significant as indicated by ($\beta = 0.37$; $p < 0.05$; $t = 4.359$; supporting H6). Lastly, the relationship between self-efficacy for self-regulation and metacognition was also positively significant as demonstrated by ($\beta = 0.59$; $p < 0.05$; $t = 12.980$; supporting H7). Subsequently, based on the effect size (f2), the 4th, 6th, and 7th hypotheses had large effect sizes, and the remaining hypotheses had medium effect sizes based on the parameter values of .02, .15, and .35 which indicated small, medium, and large effects (Hair Jr et al., 2016). Finally, the obtained significant results were convincingly supported by the confidence level of 95% which had a minor error margin of 5%.

Table 5
Results of paths analysis

	Path	Beta Value	Std. Error	t- Value	p- Values	f²	Results
H1	GM -> SEI	0.209	0.061	3.449	0.001	0.046	Supported
H2	GM -> SEC	0.216	0.051	4.213	0.000	0.085	Supported
H3	GM -> SESR	0.232	0.060	3.900	0.000	0.075	Supported
H4	SEI -> SEC	0.614	0.044	14.065	0.000	0.694	Supported
H5	SEI -> SESR	0.158	0.078	2.020	0.044	0.022	Supported
H6	SEC -> SESR	0.371	0.085	4.359	0.000	0.113	Supported
H7	SESR -> MC	0.592	0.046	12.980	0.000	0.540	Supported

Note: p < 0.05 indicates that the hypothesis is supported

DISCUSSION

The present study conducted an exploratory analysis of the interrelationships amongst academic writing growth mindsets, self-efficacy, and metacognition. This study proved that the seven hypotheses previously formulated were accepted. The first, second, and third results of this study demonstrated that positive and significant relationships were proven between academic writing growth mindsets and self-efficacy for academic writing ideation ($\beta = 0.20$; $p < 0.05$; $t = 3.449$), between academic writing growth mindsets and self-efficacy for academic writing convention ($\beta = 0.21$; $p < 0.05$; $t = 4.213$), and between academic writing growth mindsets and self-efficacy for academic writing self-regulation ($\beta = 0.23$; $p < 0.05$; $t = 3.900$). As the foregoing, it could be interpreted that the students' beliefs in the enhancement of their knowledge or intelligence related to academic writing skills by virtue of making more efforts to learn and practice (Bai & Guo, 2018) would drive them to be confident in their abilities, techniques, and insights for generating ideas while writing, be confident in working with all writing-related tools, and be confident in managing their strategies during writing (Mitchell, Harrigan, & McMillan, 2017). Brought to a more extensive view, the relationship between the variable of growth mindsets and that of self-efficacy has been examined across fields other than academic writing. For example, Zander et al. (2018) indicated that, in general, people with growth mindsets are more likely to have a high degree of self-efficacy. Derr and Morrow's (2020) study in developmental psychology showcased that an intervention for growth mindsets of personalities affects a high degree of bullying defenders' self-efficacy. Burnette et al. (2020) in the field of entrepreneurship education demonstrated that an intervention of growth mindsets increases students' self-efficacy in entrepreneurship. Buenconsejo and Datu's (2020) research in the field of youth psychology revealed that growth mindsets influence self-efficacy in career development. Studies on the interrelationships between growth mindsets and self-efficacy can also be traced in the realms of computer programming (Pembridge & Rodgers, 2019) and math (Samuel & Warner, 2021). The three sets of the current study's data above helped to confirm the previous studies' data on the interrelatedness of growth mindsets and self-efficacy especially in the field of academic writing (undergraduate thesis writing).

The fourth, fifth, and sixth results of this study indicated that academic writing self-efficacy for ideation positively and significantly correlated with academic writing self-

efficacy for convention (β = 0.21; p < 0.05; t = 4.213); self-efficacy for academic writing ideation correlated with self-efficacy for academic writing self-regulation (β = 0.15; p < 0.05; t = 2.020); and self-efficacy for academic writing convention had a relationship with self-efficacy for academic writing self-regulation (β = 0.37; p < 0.05; t = 4.359). It could be understood that students' confidence in their abilities, techniques, and insights for generating and developing ideas while writing influenced their confidence in working with all academic writing tools (e.g. Vocabularies, grammar, mechanics, language features, sematic knowledge, morphological awareness, and genres) and also affected their confidence in the abilities to control and monitor the applications of their strategic knowledge and practical strategies of academic writing. Subsequently, the student writers' confidence in their abilities to use academic writing tools (e.g. Vocabularies, grammar, mechanics, language features, sematic knowledge, morphological awareness, and genres) supported their confidence in the abilities to control and monitor the applications of their strategic knowledge and practical strategies of academic writing. The aforementioned components of self-efficacy for idea generation, convention, and self-regulation are correlated in nature, and their detailed relationships can be viewed from Bruning's et al. (2013) study that tested the interrelatedness of the three components of self-efficacy in the context of writing. Aside from the essence of self-efficacy, the elements of writing ideation and convention are, by nature, related to each other. As such, Crossley et al. (2016) proved that idea generations are significantly related to the uses of language features in writing, such as varied and difficult words, varied units of words, non-repetitive words, and semantic knowledge. As depicted in their studies, students with good capabilities of generating ideas during writing were competent at applying language features that Bruning et al. (2013) called writing convention. Writing self-efficacy itself is not something static. It is something fluid which can be enhanced as well (Mitchell et al., 2017). The nature of self-efficacy *per se* has been explained by some scholars (Lee & Evans, 2019), and they have reached an agreement on the conception that self-efficacy can be developed resting upon some conditions commonly known as active experiences, vicarious experiences, social persuasion, and people's emotional and physiological states.

The seventh result of this study uncovered that self-efficacy for academic writing regulation correlated with academic writing metacognition (β = 0.59; p < 0.05; t = 12.980). It could interpreted that the student writers' confidence in generating and developing ideas, using writing-related tools, and applying their writing strategic knowledge and practical strategies (Mitchell, Harrigan, & McMillan, 2017) triggered their abilities to plan, monitor, and evaluate their written works (Sultan & Moqbali, 2020). Metacognition is used as a problem-solving technique in writing to deal with the complexities of writing (Briesmaster, 2017). Thus, in the current study, the student writers with high self-efficacy in thesis writing would be able to use their own controlled strategies to deal with various challenges in all thesis components during writing.

An interesting point which could be learned from our study was that self-efficacy for academic writing regulation mediated the relationship between academic writing growth mindsets and academic writing metacognition. More extensively, the academic writing for self-regulation itself was influenced by other writing self-efficacy constituents,

namely self-efficacy for ideation and self-efficacy for convention. Grounded in the aforementioned relationships, an implication can be drawn. It has been agreed that students with high writing metacognition will likely have good writing performance and skills (F. Teng, 2016). Metacognition has a significant impact on writing results as a higher-order cognitive function because it teaches students how to develop specific methods for dealing with each component of writing (Luo, 2017). Learners with strong metacognition can construct successful interactions, critical arguments, and written argument rationales. The aforementioned abilities are required for writing (M. F. Teng, 2019), and the preceding clearly shows that writing metacognition has a theoretical relationship with writing performance and skills.

It is important to be elucidated that our study is not without limitations. In terms of our professional affiliations as lecturers from Central Java and Papua, we were only able to reach undergraduate students from the same provinces as ours during the course of this study. Thus, involving more undergraduate students from other provinces with different demographic information may reveal different exploratory interrelationships among the variables of writing growth mindsets, writing self-efficacy, and writing metacognition. Another limitation of our study is that this study only incorporated students of literature and education majors. It was slightly unfortunate that we, the lecturers of literature and education departments, did not get official permissions to get access to students from other departments with the purpose of researching. Therefore, our samples were limited to students from literature and education majors. Further studies which can reach students from varied departments may reveal different interactions among the variables of writing growth mindsets, writing self-efficacy, and writing metacognition. Despite such limitations, we had made concerted efforts to engage as many undergraduate students from literature and education departments as possible from the two provinces (464 respondents) in order to generate strong and representative data. As a result, we were able to conduct an exploratory analysis of the seven hypotheses focusing on the interactions amongst academic writing growth mindsets, academic writing self-efficacy, and academic writing metacognition. Our study is unique due to the incorporation of the three variables as aforementioned into a single study. Nonetheless, if viewed according to each hypothesis we worked on but not pursuant to the whole incorporation of the three variables in a single study, each hypothesis formulated in this study has been confirmed and verified by a number of previous studies both in the same field and across different fields other than academic writing.

CONCLUSION

The exploratory analysis using PLS-SEM successfully highlights the interplay among academic writing growth mindsets, self-efficacy, and metacognition. In detail, positive and significant relationships are encountered between academic writing growth mindsets and self-efficacy for academic writing ideation, between academic writing growth mindsets and self-efficacy for academic writing convention, between academic writing growth mindsets and self-efficacy for academic writing self-regulation, between self-efficacy for academic writing ideation and self-efficacy for academic writing convention, between self-efficacy for academic writing ideation and self-efficacy for

academic writing self-regulation, between self-efficacy for academic writing convention and self-efficacy for academic writing self-regulation, and between self-efficacy for academic writing self-regulation and academic writing metacognition. Also, it can be drawn that academic writing self-efficacy for self-regulation mediates the correlation between academic writing growth mindsets and academic writing metacognition. Together with growth mindsets, other constituents of academic writing self-efficacy, namely ideation and convention, concomitantly help affect academic writing metacognition. In practice, it is suggested that metacognitive interventions be required to assist students in improving their academic writing performance and skills. The input related to academic writing growth mindset and self-efficacy empowerments is critical and must be incorporated within the metacognitive interventions because academic writing growth mindsets and the mediating role of academic writing self-efficacy will both support the development of academic writing metacognition.

It is suggested that future's research be carried out to develop a structural model of academic writing factors by incorporating other variables which are influential, such as critical thinking skills, or those that may potentially contribute to the various depictions of academic writing skills and the related internal constituents of academic writing skills. The more predicting variables the future's research can involve in, the more verified and scientific information such research can provide in efforts to help academic writing academicians and educators enhance their students' academic writing skills and performances.

ACKNOWLEDGMENT

REFERENCES

Adamson, J. L., Coulson, D., & Fujimoto-Adamson, N. (2019). Supervisory practices in English-medium undergraduate and postgraduate applied linguistics thesis writing: Insights from Japan-based tutors. *The Asian Journal of Applied Linguistics*, *6*(1), 14–27.

Aliyu, M. M., Fung, Y. M., Abdullah, M. H., & Hoon, T. B. (2016). Developing undergraduates' awareness of metacognitive knowledge in writing through problem-based learning. *International Journal of Applied Linguistics and English Literature*, *5*(7), 233–240. https://doi.org/10.7575/aiac.ijalel.v.5n.7p.233

Altınmakas, D., & Bayyurt, Y. (2019). An exploratory study on factors influencing undergraduate students' academic writing practices in Turkey. *Journal of English for Academic Purposes*, *37*, 88–103. https://doi.org/10.1016/j.jeap.2018.11.006

Bai, B., & Guo, W. (2018). Influences of self-regulated learning strategy use on self-efficacy in primary school students' English writing in Hong Kong. *Reading and Writing Quarterly*, *34*(6), 523–536. https://doi.org/10.1080/10573569.2018.1499058

Bai, B., & Wang, J. (2020). The role of growth mindset, self-efficacy and intrinsic value in self-regulated learning and English language learning achievements. *Language*

Teaching Research, 1–22. https://doi.org/10.1177/1362168820933190

Bai, B., Wang, J., & Nie, Y. (2020). Self-efficacy, task values and growth mindset: what has the most predictive power for primary school students' self-regulated learning in English writing and writing competence in an Asian Confucian cultural context? *Cambridge Journal of Education*, 1–20. https://doi.org/10.1080/0305764X.2020.1778639

Blackwell, L. S., Trzesniewski, K. H., & Dweck, C. (2007). Implicit theories of intelligence predict achievement across an adolescent transition: A longitudinal study and an intervention. *Child Development*, *78*(1), 246–263.

Briesmaster, M. (2017). Coherence and cohesion in EFL students' writing production : The impact of a metacognition-based intervention. *Ikala*, *22*(1), 183–202. https://doi.org/10.17533/udea.ikala.v22n02a02

Bruning, R., Dempsey, M., Kauffman, D. F., McKim, C., & Zumbrunn, S. (2013). Examining dimensions of self-efficacy for writing. *Journal of Educational Psychology*, *105*(1), 25–38. https://doi.org/10.1037/a0029692

Buenconsejo, J. U., & Alfonso D. Datu, J. (2020). Growth and fixed mindsets about talent matter for career development self-efficacy in selected Filipino adolescents. *Children and Youth Services Review*, *118*, 1–6. https://doi.org/10.1016/j.childyouth.2020.105470

Burnette, J. L., Pollack, J. M., Forsyth, R. B., Hoyt, C. L., Babij, A. D., Thomas, F. N., & Coy, A. E. (2020). A growth mindset Intervention: Enhancing students' entrepreneurial self-efficacy and career development. *Entrepreneurship: Theory and Practice*, *44*(5), 878–908. https://doi.org/10.1177/1042258719864293

Callinan, C. J., van der Zee, E., & Wilson, G. (2018). Developing essay writing skills: an evaluation of the modelling behaviour method and the influence of student self-efficacy. *Journal of Further and Higher Education*, *42*(5), 608–622. https://doi.org/10.1080/0309877X.2017.1302564

Çandarl, D., Bayyurt, Y., & Mart, L. (2015). Authorial presence in l1 and l2 novice academic writing: Cross-linguistic and cross-cultural perspectives. *Journal of English for Academic Purposes*, *20*, 192–202. https://doi.org/10.1016/j.jeap.2015.10.001

Chakma, U., Li, B., & Kabuhung, G. (2021). Creating online metacognitive spaces: Graduate research writing during the covid-19 pandemic. *Issues in Educational Research*, *31*(1), 37–55.

Colognesi, S., Piret, C., & Demorsy, S. (2020). Teaching writing—with or without metacognition?: An exploratory study of 11-to 12-year-old students writing a book review. *International Electronic Journal of Elementary Education*, *12*(5), 459–470. https://doi.org/10.26822/iejee.2020562136

Cooper, J. B., Lee, S., Jeter, E., & Bradley, C. L. (2020). Psychometric validation of a growth Mindset and Team Communication Tool to measure self-views of growth

mindset and team communication skills. *Journal of the American Pharmacists Association*, *60*(6), 818–826.

Crossley, S. A., Muldner, K., & Mcnamara, D. S. (2016). Idea generation in student writing: Computational assessments and links to successful writing. *Written Communication*, 1–27. https://doi.org/10.1177/0741088316650178

Csizér, K., & Tankó, G. (2017). English majors' self-regulatory control strategy use in academic writing and its relation to L2 motivation. *Applied Linguistics*, *38*(3), 386–404. https://doi.org/10.1093/applin/amv033

Derr, S., & Morrow, M. T. (2020). Effects of a growth mindset of p0ersonality on emerging adults' defender self-efficacy, moral disengagement, and perceived peer defending. *Journal of Interpersonal Violence*, *35*(3–4), 542–570. https://doi.org/10.1177/0886260517713716

Escorcia, D., & Ros, C. (2019). What variables interact with metacognitive processes related to writing in university students: The role of demographic and education factors. *Electronic Journal of Research in Educational Psychology*, *17*(49), 639–664. https://doi.org/10.25115/ejrep.v17i49.2486

Grenner, E., Johansson, V., van de Weijer, J., & Sahlén, B. (2021). Effects of intervention on self-efficacy and text quality in elementary school students' narrative writing. *Logopedics Phoniatrics Vocology*, *46*(1), 1–10. https://doi.org/10.1080/14015439.2019.1709539

Guraya, S. Y., & Guraya, S. S. (2017). The confounding factors leading to plagiarism in academic writing and some suggested remedies: A systematic review. *Journal of the Pakistan Medical Association*, *67*(5), 767–772.

Hair Jr, J. F., Hult, G. T. M., Ringle, C., & Sarstedt, M. (2016). *A primer on partial least squares structural equation modeling (PLS-SEM)*. Sage publications.

Han, J., & Hiver, P. (2018). Genre-based L2 writing instruction and writing-specific psychological factors: The dynamics of change. *Journal of Second Language Writing*, *40*, 44–59. https://doi.org/10.1016/j.jslw.2018.03.001

Hass, R. W., Katz-Buonincontro, J., & Reiter-Palmon, R. (2016). Disentangling creative mindsets from creative self-efficacy and creative identity: Do people hold fixed and growth theories of creativity. *Psychology of Aesthetics, Creativity, and the Arts*, *10*(4), 436–446. https://doi.org/10.1037/aca0000081

Hastuti, I. D., Surahmat, Sutarto, & Dafik. (2020). The effect of guided inquiry learning in improving metacognitive skill of elementary school students. *International Journal of Instruction*, *13*(4), 315–330. https://doi.org/10.29333/iji.2020.13420a

Hayat, A. A., Shateri, K., Amini, M., & Shokrpour, N. (2020). *Relationships between academic self- efficacy , learning-related emotions , and metacognitive learning strategies with academic performance in medical students : a structural equation model*. 1–11.

Henseler, J., Ringle, C. M., & Sarstedt, M. (2015). A new criterion for assessing discriminant validity in variance-based structural equation modeling. *Journal of the Academy of Marketing Science*, *43*(1), 115–135.

Howe, L., & Wig, A. Van. (2017). Metacognition via creative writing: dynamic theories of learning support habits of the mind in 21st century classrooms. *Journal of Poetry Therapy*, *30*(3), 139–152. https://doi.org/10.1080/08893675.2017.1328830

Huerta, M., Goodson, P., Beigi, M., Chlup, D., Huerta, M., Goodson, P., & Beigi, M. (2016). Graduate students as academic writers : writing anxiety , self-efficacy and emotional intelligence. *Higher Education Research & Development*, 1–14. https://doi.org/10.1080/07294360.2016.1238881

Hwang, S. (2020). The mediating effects of self-efficacy and classroom stress on professional development and student-centered instruction. *International Journal of Instruction*, *14*(1), 1–16. https://doi.org/10.29333/IJI.2021.1411A

Karlen, Y. (2017). The development of a new instrument to assess metacognitive strategy knowledge about academic writing and its relation to self-regulated writing and writing performance. *Journal of Writing Research*, *9*(1), 61–86. https://doi.org/10.17239/jowr-2017.09.01.03

Kock, N. (2016). Advantages of nonlinear over segmentation analyses in path models. *International Journal of E-Collaboration (Ijec)*, *12*(4), 1–6.

Kuiken, F., & Vedder, I. (2020). The interplay between academic writing abilities of Dutch undergraduate students, a remedial writing programme, and academic achievement. *International Journal of Bilingual Education and Bilingualism*, 1–12. https://doi.org/10.1080/13670050.2020.1726280

Lee, M., & Evans, M. (2019). Investigating the operating mechanisms of the sources of l2 writing self-efficacy at the stages of giving and receiving peer feedback. *Modern Language Journal*, *103*(4), 831–847. https://doi.org/10.1111/modl.12598

Luo, Y. (2017). Engineering majors' metacognitive strategy use in EFL writing: A case study within the Web-based environments. *World Transactions on Engineering and Technology Education*, *15*(4), 323–330.

Miller, R. T., & Pessoa, S. (2016). Where's your thesis statement and what happened to your topic sentences? identifying organizational challenges in undergraduate student argumentative writing. *TESOL Journal*, *7*(4), 847–873. https://doi.org/10.1002/tesj.248

Mitchell, K. M., Harrigan, T., & McMillan, D. E. (2017). Writing self-efficacy in nursing students: The influence of a discipline-specific writing environment. *Nursing Open*, *4*, 240–250. https://doi.org/10.1002/nop2.90

Mitchell, K. M., Harrigan, T., Stefansson, T., & Setlack, H. (2017). Exploring self-effifficacy and anxiety in first-year nursing students enrolled in a discipline-specifibc scholarly writing course. *Quality Advancement in Nursing Education*, *3*(1), 1–23. https://doi.org/10.17483/2368-6669.1084

Mitchell, K. M., Mcmillan, D. E., Lobchuk, M. M., Nickel, N. C., Rabbani, R., & Li, J. (2021). Development and validation of the situated academic writing self-efficacy scale (SAWSES). *Assessing Writing*, *48*, 1–20. https://doi.org/10.1016/j.asw.2021.100524

Negretti, R., & McGrath, L. (2018). Scaffolding genre knowledge and metacognition: Insights from an L2 doctoral research writing course. *Journal of Second Language Writing*, *40*, 12–31. https://doi.org/10.1016/j.jslw.2017.12.002

Oyelekan, O. S., Jolayemi, S. S., Upahi, J. E., Education, T., & Africa, S. (2019). *Cypriot Journal of Educational*. *14*(2), 208–221.

Pembridge, J. J., & Rodgers, K. J. (2019). Examining self-efficacy and growth mindset in an introductory computing course. *Proceedings - Frontiers in Education Conference, FIE*, 1–5. https://doi.org/10.1109/FIE.2018.8658728

Pitenoee, M. R., & Modaberi, A. (2017). The effect of cognitive and metacognitive writing strategies on content of the iranian intermediate efl learners' writing. *Journal of Language Teaching and Research*, *8*(3), 594–600. https://doi.org/10.17507/jltr.0803.19

Puryantoa, E., Rasyidb, Y., & Murtadhoc, F. (2021). Prior knowledge-based metacognition strategies in developing students' writing skills assessment tools: Preparing the student teachers. *Asian EFL Journal*, *28*(1), 85–108.

Rhew, E., Piro, J. S., Goolkasian, P., & Cosentino, P. (2018). The effects of a growth mindset on self-efficacy and motivation. *Cogent Education*, *5*(1), 1–16. https://doi.org/10.1080/2331186X.2018.1492337

Sabti, A. A., Md Rashid, S., Nimehchisalem, V., & Darmi, R. (2019). The impact of writing anxiety, writing achievement motivation, and writing self-efficacy on writing performance: A correlational study of Iraqi tertiary EFL learners. *SAGE Open*, *9*(4), 1–13. https://doi.org/10.1177/2158244019894289

Samuel, T. S., & Warner, J. (2021). "I can Math!": Reducing Math anxiety and increasing Math self-efficacy using a mindfulness and growth mindset-based intervention in first-year students. *Community College Journal of Research and Practice*, *45*(3), 205–222. https://doi.org/10.1080/10668926.2019.1666063

Suen, R. (2021). EFL students' perceptions of transferable writing skills and knowledge for undergraduate thesis writing from an EAP research writing course. *Asian EFL Journal*, *28*(1), 286–314.

Sultan, I., & Moqbali, A. (2020). Metacognitive writing strategies used by Omani grade twelve students. *International Journal of Learning, Teaching and Educational Research*, *19*(8), 214–232. https://doi.org/10.26803/ijlter.19.8.12

Teng, F. (2016). Immediate and delayed effects of embedded metacognitive instruction on Chinese EFL students' English writing and regulation of cognition. *Thinking Skills and Creativity*, *22*, 289–302. https://doi.org/10.1016/j.tsc.2016.06.005

Teng, M. F. (2019). The role of metacognitive knowledge and regulation in mediating

university EFL learners ' writing performance. *Innovation in Language Learning and Teaching*, 1–15. https://doi.org/10.1080/17501229.2019.1615493

Truax, M. L. (2018). The Impact of Teacher Language and Growth Mindset Feedback on Writing Motivation. *Literacy Research and Instruction*, *57*(2), 135–157. https://doi.org/10.1080/19388071.2017.1340529

Vincent, C., Tremblay-Wragg, É., Déri, C., Plante, I., & Mathieu Chartier, S. (2021). How writing retreats represent an ideal opportunity to enhance PhD candidates' writing self-efficacy and self-regulation. *Teaching in Higher Education*, 1–20. https://doi.org/10.1080/13562517.2021.1918661

Wafubwa, R. N., & Csíkos, C. (2020). Formative assessment as a predictor of mathematics teachers' levels of metacognitive regulation. *International Journal of Instruction*, *14*(1), 983–998. https://doi.org/10.29333/IJI.2021.14158A

Warsah, I., Morganna, R., Uyun, M., Hamengkubuwono, & Afandi, M. (2021). The impact of collaborative learning on learners' critical thinking skills. *International Journal of Instruction*, *14*(2), 443–460.

Weaver, K. F., Morales, V., Nelson, M., Weaver, P. F., Toledo, A., & Godde, K. (2016). The benefits of peer review and a multisemester capstone writing series on inquiry and analysis skills in an undergraduate thesis. *CBE Life Sciences Education*, *15*(4), ar51.1-ar51.9. https://doi.org/10.1187/cbe.16-01-0072

Wong, K. K.-K. (2013). Partial least squares structural equation modeling (PLS-SEM) techniques using SmartPLS. *Marketing Bulletin*, *24*(1), 1–32.

Wu, D., Dang, W., He, D., & Bi, R. (2017). Undergraduate information behaviors in thesis writing: A study using the Information Search Process model. *Journal of Librarianship and Information Science*, *49*(3), 256–268. https://doi.org/10.1177/0961000616654960

Yeager, D. S., & Dweck, C. S. (2012). Mindsets that promote resilience: when students believe that personal characteristics can be developed. *Educational Psychologist*, *47*(4), 302–314. https://doi.org/10.1080/00461520.2012.722805

Zaki, A. A., & Md Yunus, M. (2015). Potential of mobile learning in teaching of ESL academic writing. *English Language Teaching*, *8*(6), 11–19. https://doi.org/10.5539/elt.v8n6p11

Zander, L., Brouwer, J., Jansen, E., Crayen, C., & Hannover, B. (2018). Academic self-efficacy, growth mindsets, and university students' integration in academic and social support networks. *Learning and Individual Differences*, *62*, 98–107. https://doi.org/10.1016/j.lindif.2018.01.012