ENHANCING ACADEMIC WRITING PERFORMANCE THROUGH DIRECT INSTRUCTION OF THE ACADEMIC FORMULAS

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ABSTRACT

This paper discusses the results of a study on formula instruction conducted among mixed-ability diploma level university students. The main objective of the study was to investigate whether incorporating direct instruction of academic formulas (DIAF) into an academic writing class would encourage the use of the target academic formulas (TAF) in the post academic essay writing (AEW) test, and improve the subjects' academic writing performance. Two intact groups of diploma level university students enrolled in an academic writing course employing a process-oriented writing approach participated in the study. Both groups consisted of forty students and were assigned as the experimental and control groups. DIAF was incorporated into the existing academic writing course's syllabus and was conducted two hours per week over six out of the fourteen-week semester. Pre and post AEW tests were used to assess the subjects' academic writing performance before and after the treatment. The results of the study are discussed by addressing three research questions: 1) What are the effects of DIAF on the TAF use in the post AEW test? 2) What is the effect of TAF use on the post AEW test scores? 3) What are the effects of DIAF on the subjects' academic writing performance? It was concluded that DIAF encourages the use of more TAF and a more varied selection of TAF in the post AEW test. There is a significant but weak positive linear relationship between the number of TAF used in the post AEW test and the post AEW test scores (r=0.473), and the number of TAF used is a significant predictor in estimating the scores for all the three AEW test components. DIAF is also beneficial at enhancing the subjects' academic writing performance with a large effect size of 0.98 for 'language' component, 0.86 for 'organization' component and a small effect size of 0.45 for 'content' component.

Indexing terms/Keywords

Instruction of Academic Formula, Academic Writing Performance.

Academic Discipline And Sub-Disciplines

Education: Teaching English as a Second Language (TESL), Teaching English as a Second and Other Language (TESOL)

SUBJECT CLASSIFICATION

English for Academic Purposes

TYPE (METHOD/APPROACH)

Mixed-Method: Quasi-Experimental &Focus Group Interview

INTRODUCTION

One of the skills essential for tertiary studies is the ability to write academically since the students have to make a transition from school-based to university-based writing when entering their respective academic programmes (Jones, Turner & Street, 1999). University students are required to learn how to operate successfully in an academic discourse that implies knowledge of the lexical convention, expectations and formulaic expressions particular to the discourse community (Flowerdew, 2000).However, it has been reported that many undergraduates in Malaysia's public and private universities do not have the command of English expected of tertiary level learners (Adzmi, Bidin, Ibrahim & Jusoff, 2009). There is growing evidence that the university students' lack of competence in academic writing affects their overall academic performance (Ismail, 2008), since academic performance at tertiary level is evaluated mostly based on written work (Kelley, 2008). This study was conducted to investigate whether incorporating direct instruction of academic formulas (DIAF) into an academic writing class would encourage the use of the target academic formulas (TAF) in the post academic essay writing (AEW) test, and improve the subjects' academic writing performance. The study aims at answering the following research questions: 1) What are the effects of DIAF on the TAF use in the post AEW test? 2) What is the effect of TAF use on the post AEW test scores? 3) What are the effects of DIAF on the subjects' academic writing performance?

Poor English Language Proficiency Among Malaysian Students

The concern over low literacy attainment in English language among Malaysian learners has been investigated quite extensively. A review of research conducted to examine English language learning in Malaysian schools reveals that one of the major obstacles in learning English is the strong influence of the national language or Bahasa Malaysia (Jalaludin, Mat Awal & Abu Bakar, 2008). Others have attributed the limited success among Malaysian learners in acquiring English language proficiency to what they aptly termed as "privileging examination" (Koo, 2008, p.56). Due to high importance placed on national examination, the more popular teaching method in schools is drilling using past-year examination questions, work sheets and exercise books (Pandian, 2002) which do not encourage effective learning in the English classroom (Pandian, 2006).Thus, the students who emerged from the school system are characterized as those who could pass the examinations and advanced to tertiary level without actually being able to use the English language productively (Che Musa, Koo & Azman, 2012).

Background of the Study

Academic writing course is offered to diploma level students at Universiti Teknologi MARA (UiTM), a public university in Malaysia as part of its English for Academic Purposes (EAP) package. The main objective of the course is to prepare the students to write effectively in their content studies since English is used as the medium of instruction for all technical as well as some non-technical programmes in UiTM. The course is conducted six hours per week, and is made up of three components; academic reading, academic writing and speaking, with two contact hours allocated for each component. The weightage for evaluation of the speaking and reading components is 20% each while 60% is allocated for the writing component. The evaluation of the writing component is based on: (a) a term paper (30%) and (b) final examination (30%). Throughout the course, the students submit three written assignments: an outline of the term paper (5%), a draft of the term paper (10%) and the term paper (15%). At the end of the semester, they sit for the final examination which covers academic reading comprehension (10%) and academic writing (20%). The academic writing course in UiTM adopts the process-oriented writing approach of instruction where the students go through stages in the writing process which are planning, drafting and revising. After each stage, the student's written work is reviewed by their peers and teachers and is returned to be revised. The revised work is submitted for evaluation only after several drafts.

True to the process writing principle, the issues of grammar and lexis are sidelined and addressed only as needed in the context of writing. Under process-oriented writing approach, the linguistic skills such as grammar and lexis are marginalized due to the assumption that university students (being advanced L2 learners), will naturally acquire the L2 grammar and lexis if exposed to texts and discourse to learn from (Hinkel, 2004). Zamel (1982) stated that teaching ESL writing through the writing process and revising multiple drafts allows ESL practitioners to hope that L2 writers would develop themselves and would overcome their weaknesses in grammar and lexis over time. However, like many undergraduates from other institutions of higher learning in Malaysia, UiTM undergraduates' proficiency level does not meet the criteria of 'advanced level L2 learners' to begin with. In fact, there is evidence that it is far below the level expected of tertiary level learners (Adzmi et al., 2009). It is also observed based on research conducted among UiTM undergraduates that they do not have sufficient academic vocabulary repertoire (Mokhtar, 2010; Jamian, Sidhu & Muzafar, 2008) to function effectively in their content studies. Although the inception of process-oriented writing approach was espoused by sound theoretical foundation (Leki, 1996), ESL writers like many UiTM's undergraduates lack the necessary language skills to capitalize on the advantages and benefits offered by the process-oriented writing instruction.

Statement of the Problem

As one of the public universities in Malaysia, UiTM is also facing the challenges of poor academic language proficiency which contributes to poor academic writing performance among its undergraduates (Adzmi et al., 2009; Jamian et al., 2008; Mokhtar, 2010). Research conducted among Malaysian undergraduates has come to the conclusion that one of the factors which contribute to their weaknesses in academic writing is poor knowledge of general as well as academic vocabulary (Adzmi et al., 2009; Kaur, Othman & Abdullah, 2008). Many of these undergraduates are reported to have not acquired the minimum level of vocabulary knowledge expected for tertiary level studies (Abdullah, 2012; Mokhtar, 2010), thus are facing problems in expressing their thoughts and ideas clearly when it comes to the task of writing academic paper in English (Jamian et al., 2008). It is apparent that there is a pressing need for an intervention programme to address this problem. It has been established that vocabulary knowledge is acquired incrementally (Nagy & Scott, 2000) and receptive knowledge is a requirement for productive vocabulary use (Waring, 2002). Research has shown that it takes several focus encounters in context with lexical items before they are receptively and eventually productively acquired (Nation, 2007). Thus, an intervention programme in the form of direct instruction of academic vocabulary which promotes 'noticing' is envisaged to be beneficial in expediting ESL learners' vocabulary acquisition which in turn will enhance their academic writing performance.

REVIEW OF RELATED LITERATURE

Hinkel (2004) has proposed that in addition to grammar, academic vocabulary should also be explicitly taught in an academic writing class. However, due to limited time allocated to developing academic writing at tertiary level, the variety of academic vocabulary to be explicitly taught has to be specified in order for the proposal of direct instruction to be practical. Thus, this study has turned to recent development in second language acquisition (SLA) research which has amassed mounting evidence on the highly formulaic nature of language based on research conducted in the fields of corpus linguistics and psycholinguistics (Biber & Barbieri, 2007; Conrad, 2008; Sinclair, 1991; Wray, 2002) to address the problem. Formulaic language or formula, "fulfil the same functions as single words" (Boers & Lindstromberg, 2012, p. 84) and similar to vocabulary knowledge which has been found to be a strong predictor of general proficiency (Schmitt, Jiang & Grabe, 2011), L2 learners' knowledge of multiword lexis is highly correlated with proficiency level (Keshavarz & Salimi, 2007; Kennedy & Thorpe, 2007).

Academic Formula

Several recent learner-corpus-based studies have been conducted to compare the use of multiword units or formulas in different corpora (Allen, 2011; Chen & Baker, 2010) as well as to determine the most frequently used multiword expressions in different prose (Biber, 2006; Biber & Barberi, 2007; Hyland, 2012; Simpson-Vlach & Ellis, 2010). Most of these studies deal with learners' use of multiword units in writing and have shed new light on different categories of multiword units such as idiomatic expressions (Wiktorsson, 2003), collocations (Nesselhauf, 2005), phrasal verbs (Waibel, 2007) and lexical bundles (Hyland, 2008). Many linguists have tried to develop academic formula lists to be used as guides for academic writing teachers. Among them are Simpson-Vlach and Ellis (2010) who have compiled a list of high-frequency academic-specific bundles for teaching purposes. The list which is labelled as an academic formula list (AFL) consists of over 200 three-, four-, and five-word bundles which are statistically more common in academic texts than in a large corpus of 15 non-academic spoken and written genres. It is a list of formulas that transcend disciplinary boundaries. Although there have been different definitions and characteristics of academic formula put forward by different scholars, the term 'academic formula' used in this study is derived from the definition utilized by Simpson-Vlach and Ellis (2010) when developing the Academic Formula List (AFL) as well as the definition proposed by Hyland (2012). Academic formulas are defined as formulas in corpora of written and spoken language which appear significantly more frequently in academic than non academic discourse and inhabit a wide range of academic genres, helping to shape meanings in specific contexts as well as contributing to the sense of coherence in a text.

Pedagogical Approach to Academic Formula

There has been no conclusive agreement on how academic formula should be included in L2 teaching curricula. There is also little information based on research evidence on the most useful pedagogical approach to formulas (Coxhead, 2008). Among the challenges of formula instruction are deciding *which* formulas to teach and *how* to teach them. Granger (2011) has suggested that formula instruction should be integrated progressively via "mini-action programmes" as proposed by Lewis (2000, p. 153). For example, ESL teachers could conduct local experiments which are integrated into the teachers' preferred or imposed teaching curriculum. A resource that may contribute to efficient integration of the approach is what Willis (2003, p. 163) labelled as "pedagogic corpus". Pedagogic corpus refers to corpus made up of texts used in the classroom as teaching materials. This is advantageous as the lexical phrases or formulas chosen for teaching are extracted from texts that learners have already processed for meaning. According to Willis (2003), selecting the formulas to teach in this manner would ensure better contextualization, increase relevance and promote higher level of motivation among learners. It has been established that frequency effect is the most robust effect in psycholinguistic investigation and it has been accepted that words that are encountered more often are recognized faster (Tremblay, Derwing, Libben & Westbury, 2011). Drawing on this knowledge and past research on the teaching of formulas, formula instruction should provide students with repeated encounters of the formulas because as assert by Kozlowski and Seymour (2003) chunks and language patterns need to be heard, written, spoken and read repeatedly so that they would become imprinted in the students' memory. Since vocabulary knowledge builds incrementally, to help build this knowledge requires several focused encounters in context and in classroom activities.

METHODOLOGY

The study was conducted among eighty (N=80) Diploma in Computer Science students registered for the Academic Writing course at University Teknologi MARA (UiTM) Seri Iskandar Perak campus. The study period was fourteen weeks. A quasi-experiment, with an experimental (N=40) and a control group (N=40), was chosen to collect the data for the study. The data was collected by administering pre and post Academic Essay Writing (AEW) tests to both the experimental and control groups. The pre test was administered before the treatment (DIAF) while the post test was administered at the end of the study period. The data collected includes; a) the pre and post AEW test scores, b) the number of target academic formula (TAF) used in the post AEW test. The Academic Writing course's syllabus covers three skills which are 'academic reading', 'academic writing' and 'speaking'. It has six contact hours per week (3 x two-hour class) and the time is divided equally among the three skills. DIAF was conducted during the period allocated for 'academic writing' component and was conducted two hours per week for six weeks.

Direct Instruction of the Academic Formula (DIAF)

Since the study was conducted among students who were attending an academic writing course, the experimental variable, DIAF, was designed to fit into the course's current syllabus with minor adjustment to the course's schedule and scheme of work. In addition, exercises for TAF were designed as study tools and embedded into the classroom activities. This was to ensure minimum disruption to the normal classes and to avoid resistance from both students and lecturers towards the experimental method being studied. The 'treatment' was carried out during week three, five, eight, nine, ten and eleven. Each session of DIAF took two hours where the subjects were exposed to the list of the target formulas and directly taught how to use them in their academic writing. DIAF involves several types of activities which were conducted during the experimental period. The first activity involved learning the target formulas in context. Prior to the activity, the list of the target academic formulas was distributed to the subjects. The subjects were given two reading comprehension passages of the same theme to work on. The target academic formulas found in the passages were highlighted and their meaning and functions were discussed. The subjects' awareness of the formulas was raised as they read the passages and answer the comprehension questions. In addition to awareness raising exercises, the subjects practised constructing sentences using the target formulas. It was followed by exercises in developing thesis statements and topic sentences. Finally, they practised using TAF in developing a paragraph and in writing a full academic essay. Both the experimental and control groups' lecturers were furnished with lesson plans prepared for fourteen weeks. The control group utilised the course's existing lesson plans while the experimental group's lesson plans for week 3, 5, 8, 9, 10 and 11 were designed to accommodate DIAF. Since minor adjustments were made to the scheme of work, the lesson plans were also adjusted accordingly.

Selection of Target Academic Formula

Thirty target formulas for the study were chosen from the Academic Formula List (AFL) by Simpson-Vlach & Ellis (2010). The formulas were chosen based on the fact that they appear at least once in the: (a) prescribed textbook entitled EAP Crossing Borders (Micheal et al., 2010) and/or, (b) supplementary material used in the academic writing course. All students who registered for the academic writing course had to purchase the prescribed textbook and both the experimental and control groups were provided with the supplementary materials. Therefore, subjects from the experimental group were exposed to the formulas through direct instruction while the subjects from the control groups were exposed to the formulas indirectly when using the course's prescribed textbook and the supplementary materials. Another consideration in TAF selection is that the formulas have to be recognizable to the subjects and are commonly found in teaching materials not only for the academic writing course but other courses in their academic discipline such as lab reports, term papers and written assignments. Table 1 shows the target academic formula (TAF) chosen for the study.

Table 1: Target Academic Formula

in relation to [1]	can be/ is/ are affected by[11]	due to the fact that[21]
in response to [2]	give rise to[12]	as a consequence[22]
(from)(the) point of view (of) [3]	as well as[13]	as a result of[23]
to distinguish between[4]	more/less likely to[14]	due to the[24]
the relationship between[5]	there are (three/a few/many) [15]	can be achieved[25]
in conjunction with[6]	there are several[6]	appears to be/ does not appear to be[26]
according to the[7]	there is/are no[17]	there has been/there have been[27]
can be considered[8]	on the basis of[18]	a large number of[28]
a variety of[9]	in terms of (the) [19]	the number of[29]
with regard to[10]	in accordance with[20]	(there) are a number (of) [30]

RESULTS AND DISCUSSIONS

The results of the study will be discussed in tandem to answering the research questions (RQs).

RQ1: What are the effects of DIAF on the TAF use in the post AEW test?

To answer the first research question, the use of TAF in the post AEW test was analysed. Table 2 shows the number of TAF used by the experimental and control groups. Based on the table it can be concluded that although the control group was indirectly exposed to all the formulas during their lessons, they had used fewer TAF in the post AEW test than the experimental group. Other than the formulas 'according to' and 'there are some', the experimental group had used the TAF more frequently compared to the control group in the post AEW test. The TAF used by the experimental group were also more varied.

Table 2: TAF use by the experimental and control group

	TARGET ACADEMIC FORMULA	Exp. Group	Cont. Group	Total
		No. of Use	No. of Use	
1	in relation to	3	0	3
2	in response to	0	0	0
3	from the point of view	2	0	2
4	to distinguish between	0	0	0
5	the relationship between	1	0	1
6	in conjunction with	1	0	1
7	according to the	29	55	84
8	can be considered	2	0	2
9	a variety of	25	10	35
10	with regard to	1	0	1
11	is/ are / can be affected by	2	0	2
12	give rise to	5	0	5
13	as well as	6	0	6
14	more/less likely to	3	1	4
15	(there) are a number (of)	5	2	7
16	a large number of	5	8	13
17	there are (three a/few/many)	17	6	23
18	there are several	23	9	32
19	the number of	16	8	24
20	there have been/ there has been	10	4	14
21	there is no	5	2	7
22	appears to be/ does not appear to be	5	0	5
23	on the basis of	1	0	1
24	in terms of	9	0	9
25	in accordance with	0	0	0
26	due to the fact that	8	0	8
27	as a consequence	3	0	3
28	as a result of	11	1	12
29	due to	10	0	10
30	can be achieved	1	0	1
	TOTAL	209	106	315

RQ2: What is the effect of TAF use on the post AEW test scores?

In order to answer the second research question, simple linear regression analysis was conducted. Table 3 shows the regression analysis model summary.

Table 3: Regression Analysis Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.473a	.224	.214	12.4243
a. Predictors: (Constant), TAF_USE				
b. Dependent Variable: Post AEW				

Based on the table, the magnitude of Pearson's correlation coefficient (R) for the linear relationship between the number of TAF used in the post AEW test and the post AEW test scores is 0.473 which signifies a weak positive linear relationship. The adjusted R^2 value is 0.214 which indicates that the independent variables (the number of TAF used in the post AEW test) can account for 21.4 % of the variances in the dependent variable (post AEW test scores).

Table 4: Regression Analysis Coefficients

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	49.046	2.572		19.068	.000
	Number of TAF used	2.607	.550	.473	4.743	.000
a. Dependent Variable: Post AEW Test Scores						

Table 4 displays the regression analysis coefficients. The table indicates that there exists adequate evidence to conclude that the number of TAF used in the post AEW test is a significant predictor in estimating the post AEW test scores which suggests that to a certain extent, the increase in the number of TAF use in the AEW test has a positive effect on the AEW test scores.

RQ3) What are the effects of DIAF on the subjects' academic writing performance?

In order to answer the third research question, a paired-sample *t*-test was conducted to compare the means of pre and post AEW test scores for both the experimental and control groups followed by analysis of covariance (ANCOVA) which was conducted to determine the effect of DIAF on the post AEW test scores when the subjects' previous knowledge was statistically controlled. Finally, effect size of DIAF on the subjects' academic writing performance was determined.

Paired Samples Test Results

To determine the effect of DIAF on the subjects' academic writing performance, the means for pre and post AEW test scores for the experimental and control groups were compared using a paired-sample *t*-test. Table 5 shows the descriptive statistics of the AEW test scores.

Table 5: Descriptive Statistics for Pre and Post AEW Test Scores

Group	N	Mean		SD	
		Pre	Post	Pre	Post
Experimental	40	50.3	64.9	15.1	14.1
Control	40	50.1	53.7	12.1	11.6

The paired-sample *t*-test was conducted for the overall AEW test scores as well as for the different writing components ('content', 'language' and 'organization'). Table 6 shows the results for overall paired-sample test while Table 7 shows the results for the different writing components. Based on Table 6, the experimental group shows the *p* (2-tailed) value of 0.000 while the control group shows the *p* value of 0.015. Both values are lower than the predetermined alpha value of 0.025 (α/2 =0.025). Thus, the null hypotheses which stated that 'there is no significant difference between the mean score of the pre and post test for the experimental group (Ho: μ1 = μ2) and the mean score of the pre and post test for the control group (Ho: μ3 = μ4)' were rejected. This indicates that there is a significant difference between the means of pre and post AEW test scores for the experimental group and there is also a significant difference between the mean of the pre and post AEW test scores for the control group. These conclusions were made at 95% confidence level.

Table 6: Paired Samples Test Result

		Paired Differences					t	df	Sig. (2-tailed)
		Mean	SD	Std. Error Mean	95% Confidence Interval of the Difference				
					Lower	Upper			
Pair 1	Pre-Post AEW Exp.	-14.69	10.82	1.711	-18.148	-11.228	-8.586	39	.000
Pair 2	Pre-Post AEW Cont.	-3.63	9.00	1.424	-6.505	-.745	-2.546	39	.015

Table 7 shows the paired-sample test results for the three writing components for both the experimental and control groups. Pair 1 and Pair 2 are the pre and post AEW test scores for the 'content' component of the experimental and control groups respectively. Pair 3 and Pair 4 are the pre and post AEW test scores for 'language' component of the experimental and the control groups respectively. Finally, Pair 5 and Pair 6 are the pre and post AEW test scores for 'organization' component of the experimental and the control group respectively.

Table 7:Results of the Paired-Sample Test for the Different Writing Components

		Paired Differences					t	df	Sig. (2-tailed)
		Mean	SD	Std. Error Mean	95% Confidence Interval of the Difference				
					Lower	Upper			
Pair 1	Pre-Post 'content'_Exp.	-3.8125	4.3481	.6875	-5.2031	-2.4219	-5.55	39	.000
Pair 2	Pre-post 'content'_Cont.	-1.5000	3.4807	.5504	-2.6132	-.3868	-2.73	39	.010
Pair 3	Pre-Post 'language'_Exp.	-5.5000	6.1290	.9691	-7.4601	-3.5397	-5.68	39	.000
Pair 4	Pre-post 'language' _Cont.	-.9375	5.2406	.8286	-2.6135	.7385	-1.13	39	.265
Pair 5	Pre-Post 'organisation' _Exp.	-5.3125	4.9739	.7864	-6.9032	-3.7218	-6.76	39	.000
Pair 6	Pre-post 'organization'_Cont.	-1.3125	3.8807	.6136	-2.5536	-.07138	-2.14	39	.039

Based on the inferential analysis using paired-sample *t*-test on the overall AEW test scores, it can be concluded that both the experimental and the control groups performed significantly better in the post test. However, based on the paired-sample *t*-test results for the different writing components, it was found that the experimental group performed significantly better in the post test for all the three components while the control group only improved significantly with regard to 'content'. The improvements for 'language' and 'organization' components for the control group were not significant. The treatment (DIAF) can significantly improve the students' overall academic writing performance since the results show that the experimental group outperformed the control group which did not go through the treatment.

Analysis of Covariance (ANCOVA)

Next, the extent of the effect of DIAF on the subjects' academic writing performance is examined using Analysis of Covariance (ANCOVA). Analysis of Covariance (ANCOVA) was conducted to minimize the possible errors by individual differences in the samples, and to ensure that the difference in the means of the experimental group and the control group is due to the treatment alone. The analysis of covariance was used to hold the subjects' previous knowledge constant while determining the effect of DIAF on students' post-test performance. In this analysis, the pre-test scores served as covariates and the post-test scores were used as the dependent measures. Table 8 shows the results of one-way ANCOVA for the overall scores.

Based on Table 8, since the probability value obtained for 'PRE_AEW' is 0.000 which is smaller than the predetermined alpha value of 0.05, the null hypothesis which stated that 'there is no significant difference in the mean score between the experimental and control groups when students' previous knowledge is statistically controlled', was rejected. There exists adequate evidence to show that there is significant difference in the mean scores between the experimental and control groups when students' previous knowledge is statistically controlled. Since the probability value obtained for 'METHOD' is 0.000 which is also smaller than the predetermined alpha value of 0.05, the null hypothesis which stated that 'there is no significant difference in the mean scores between the experimental and control groups according to methods of instruction', was also rejected. There exists adequate evidence to show that there is significant difference in the mean scores between the experimental and control groups according to methods of instruction. The value of adjusted R^2 is 0.588 which means that the independent variable (METHOD) can account for 58.8 % of the variance in the dependent variable (post AEW test scores).

Table 8: Results of One-Way ANCOVA for the Overall Scores

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	9284.582a	2	4642.291	57.399	.000
Intercept	3445.063	1	3445.063	42.596	.000
PRE_AEW	6753.332	1	6753.332	83.500	.000
METHOD	2474.103	1	2474.103	30.591	.000
Total	296950.000	80			
Corrected Total	15512.188	79			
Dependent Variable: POSTAEW_SCORES					
a. R Squared = .599 (Adjusted R Squared = .588)					
b. Computed using alpha = .05					

To determine whether there is significant difference between the means of the experimental and the control groups for the three separate components of the post AEW test when the students' previous knowledge is statistically controlled, one way ANCOVA was conducted on the scores of the 'Content', 'Language' and 'Organization' components with the mean scores of each component in the pre AEW test used as their covariates. Table 9 shows the results of one-way ANCOVA for AEW teat components. Based on Table 9, the probability value obtained for all the three components; 'Pre-Content', 'Pre-Language' and 'Pre-Organization' is 0.000. Since the value is smaller than the predetermined alpha value of 0.05, the null hypotheses which stated that 'there is no significant difference in the mean scores of the different components of the AEW test between the experimental and control groups when students' previous knowledge is statistically controlled', was rejected. There exists adequate evidence to show that there is significant difference in the mean score between the experimental and control groups when students' previous knowledge of each component is statistically controlled.

Next, the probability values obtained for 'METHOD' for 'content' component is 0.008 while the values for both 'language' and 'organization' are 0.000 respectively. These values are also smaller than the predetermined alpha value of 0.05 which means the null hypothesis which stated that 'there is no significant difference in the mean scores between the experimental and control groups according to methods of instruction', was rejected. There exists adequate evidence to show that there is significant difference in the mean score between the experimental and control groups according to methods of instruction.

Table 9: The results of one-way ANCOVA for AEW Test Components

Source	Type III Sum of Square	df	F	Sig	R²	Adjusted R²
Pre-Content	480.442	1	38.940	0.000	0.369	0.353
Method	92.579	1	7.504	0.008		
Pre-Language	1030.253	1	49.381	0.000	0.511	0.498
Method	681.176	1	32.650	0.000		
Pre-Organization	359.598	1	23.865	0.000	0.359	0.343
Method	237.227	1	15.744	0.000		

Thus, it can be inferred from the ANCOVA results that the experimental group performed significantly better than the control group in the overall scores as well as the scores for all the three writing components after going through the treatment (DIAF). DIAF can account for more of the variances in 'language' component compared to 'organization' and 'content' components.

Effect Size of DIAF on Academic Writing Performance

In order to quantify the strength of the difference between the means of the experimental and the control groups, the effect size of DIAF on the overall academic writing performance was calculated. The effect size was calculated as the mean of the overall post AEW test scores of the experimental group minus the mean of the overall post AEW test scores of the control group divided by the pooled standard deviations. Table 10 shows the effect size for the overall AEW test performance and the three different components of the AEW test.

The results indicate that the effect size of DIAF on the students' overall academic writing performance is 0.87. This can be interpreted as a large effect size according to Cohen (1992). A closer look at the AEW test scores for the different writing components reveals that the effect of DIAF is the largest for the 'language' component (0.98) followed by the 'organization' component (0.86) and finally the 'content' component (0.45).

Table 10: Effect Size of DIAF on the Academic Writing Performance

AEW TEST COMPONENTS	EFFECT SIZE	INTERPRETATION
Content	0.45	small
Language	0.98	large
Organization	0.86	large
Overall	0.87	large

The answer for the second research question "What are the effects of DIAF on the subjects' academic writing performance?" can be summarized as; a) DIAF has a positive effect on the subjects' academic writing performance since the experimental group outperformed the control group in the post AEW test for all the three writing components ('content', 'language' and 'organization') and secondly; b) The effect size of DIAF on the 'content' component of the Academic Essay Writing test is small but the effect size for 'language' and 'organization' components is large.

DISCUSSION AND CONCLUSION

Based on the findings of the study it can be concluded that DIAF is beneficial at encouraging the use of academic formulas in the academic essays since the experimental group used more TAF in the post AEW test compared to the control group, and TAF use by the experimental group was more varied. These findings are consistent with the findings of other researchers such as Yunus and Awab (2011); Namvar (2012); Naderishahab and Tahririan (2013) that teaching the formulas would improve L2 learners' knowledge and use of the formulas. It was also found that DIAF has beneficial effects on the subjects' academic writing performance since the experimental group improved significantly in all the three writing components ('content', 'language' and 'organization') while the control group only improved significantly in terms of 'content'.

Additionally, DIAF was found to have greater effects on 'language' and 'organization' components of the academic essay compared to 'content'. DIAF has a large effect size (0.98) on the 'language' component of the post AEW test and a large effect size (0.86) on the 'organization component' of the same test. However, the effect size of DIAF on the 'content' component of the post AEW test is small (0.45). Since the subjects' knowledge of TAF was enhanced it is only natural for the subjects to improve their scores in the 'language' component of the AEW test. Hyland (2012) stresses that the use of academic formulas in writing can facilitate efficient communication since the formula used can structure an academic

discourse by guiding the readers through a text. The study has provided some evidence to support Hyland's (2012) notion since the effect size of DIAF on the 'organization' aspect of the post AEW test is large.

It can also be concluded from the study that process-oriented writing approach incorporating direct teaching of the academic formulas (DIAF) is better at enhancing the students' academic writing performance than the process-oriented writing approach without DIAF. The findings of the study are consistent with previous intervention study which found that instruction of formulas has positive effects on the quality of academic essays (Siik, 2006). DIAF is beneficial at raising the learners' awareness of the formulas and its implementation facilitates 'noticing'. Since 'noticing' is a requirement for learning, direct teaching of the formulas could expedite acquisition of these formulas. As stressed by Tremblay et al.(2011) that frequency effect is the most robust effect in psycholinguistic investigation and chunks and language patterns need to be heard, written, spoken and read repeatedly so that they would become imprinted in the students' memory (Kozlowski & Seymour, 2003). Since vocabulary knowledge builds incrementally, to help build this knowledge requires several focused encounters in context and in classroom activities.

Two major concerns in formula instruction are the target formula selection and its operationalization. This study has presented empirical evidence on the positive effects of direct instruction of the academic formulas chosen from the learners' 'pedagogic corpus' or corpus made up of texts used in the classroom as proposed by Willis (2003) and has provided valuable insights as to how to operationalize formula instruction to add to the pool of knowledge in the field of second language acquisition.

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