Academic Writing Development of a Sample of Cairo University Egyptian EFL Students: A Longitudinal Study(*)

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Abstract
The aim of the present study is to understand the nature of the second language acquisition process with regard to the writing skill in terms of syntactic complexity, accuracy, and fluency. The academic writing developmental path was followed over one academic year (six months) for each individual student included in a sample consisting of 10 Egyptian EFL freshmen. The correlation among syntactic complexity, accuracy, and fluency was also explored for each individual student. The ten cases were enrolled in a class in the Department of English language and Literature, Faculty of Arts, Cairo University. The research is a longitudinal multiple-case study. A mixed (non-experimental) exploratory design is adopted. Qualitative data, which were the students' written essays, were collected over one academic year twice a month (11 times). The results indicated fluctuation in the written performance of the cases. The cases did not progress right through. Seven developmental patterns were revealed for syntactic complexity, four for accuracy, and only one pattern was demonstrated for fluency. The correlations among syntactic complexity, accuracy, and fluency were found to be dynamic. For three out of the 10 cases, correlations turned out to be positive after

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being negative initially. For 7 out of the 10 cases, correlations turned out to be negative by the end of the academic year. These findings imply that dynamicity is the impetus power of language development, and exposure to language input and teaching does not directly transform into grammatically accurate or highly fluent complex language.

Key words

Longitudinal multiple-case-study, academic writing developmental path, fluency, accuracy, syntactic complexity

الملخص

تهدف هذه الدراسة إلى استكشاف طبيعة المسار التطوري لاكتساب مهارة الكتابة باللغة الإنجليزية. قامت هذه الدراسة باتباع المسار التطوري للكتابة الأكاديمية؛ من حيث الطلاقة والدقة والتعقيد اللغوي على مدى عام أكاديمي لعينة من طلاب جامعة القاهرة المصريين من دارسي اللغة الإنجليزية بوصفها لغة أجنبية. وقامت هذه الدراسة أيضًا باستطلاع العلاقة بين تطور الطلاقة والدقة والتعقيد اللغوي على مدار العام الأكاديمي لكل طالب من طلاب العينة. تتكون عينة هذه الدراسة من عشرة طلاب وهم ينتمون للفرقة الأولى بقسم اللغة الإنجليزية، بكلية الآداب، جامعة القاهرة. يتسم هؤلاء الطلاب جميعهم بنفس مستوى الكفاءة في اللغة الإنجليزية وهو المستوى ما بين المتوسط وما قبل المتوسط. يعد هذا البحث دراسة طولية لحالات متعددة. يعد هذا البحث استكشافي وليس تجريبي. تم تجميع بيانات كيفية من مقالات يقوم الطلاب بكتابتها مرتين شهريًا (١١ مرة) على مدى العام الأكاديمي. أوضحت نتائج الدراسة أن أداء الطلاب تميز بالتغير وعدم الثبات، فلم يتطور أداء الطلاب بشكل دائم. فأوضحت النتائج سبعة أنماط مختلفة التعقيد اللغوي وأربعة أنماط للدقة ونمط واحد فقط للطلاقة. وأظهرت أيضًا نتائج هذه الدراسة أن العلاقة بين الطلاقة والدقة والتعقيد اللغوي ليست ثابتة ولكنها علاقة ديناميكية ومتغيرة، فكانت العلاقة سلبية في البداية ثم تحولت إلى علاقة إيجابية لثلاثة طلاب فقط بينما كانت العلاقة سلبية في نهاية العام لسبعة طلاب. وتدل هذه النتائج على أن التغير وعدم الثبات في الأداء هو القوة المحركة لعملية اكتساب اللغة الثانية وأيضًا ليس بالضروري أن يؤدي التعلم الرسمي في الجامعة مباشرة إلى الكتابة على مستوى مرضٍ من الدقة والطلاقة والتعقيد اللغوي.

الكلمات مفتاحية: دراسة طولية لحالات متعددة، المسار التطوري للكتابة الأكاديمية، الطلاقة، الدقة، التعقيد اللغوي.

Introduction

One of the concerns of the second language acquisition (SLA) research is the language development of learners (Hokamura, 2018). According to Ellis (2015), most of the previous research perceived the SLA process as an idealized process which means that it is fixed and stable for all learners. Nevertheless, the SLA process is neither universal nor predictable (Ellis, 2015). The process of learning a second/foreign language is not the same for all learners; each learner has a unique developmental path (Ellis, 2015). Ellis reached this conclusion after tracing the SLA research history.

He reviewed four studies that were conducted from the 1970s up to 2011. These studies aimed at investigating the nature of language development using different methodologies. The results of the four studies reported dynamicity and non-linearity in the developmental path of all participants; in addition, each learner has a distinctive developmental path that is different from the rest of his colleagues (Ellis, 2015). Ellis called this "de-idealization." The "de-idealization" perspective challenged the old approach of the standard or the fixed developmental route of L2 learners. Therefore, language development is characterized by variability and variation among learners (Verspoor et al., 2017).

> Variability means that the learner's developmental course changes over time, and it does not remain steady. Variation means that learners differ among themselves with regard to the nature of their L2 developmental process (Verspoor et al., 2017). Larsen-Freeman (2018) stressed the same idea of Ellis (2015) asking SLA researchers to avoid making generalizations regarding the nature of the SLA process as these generalizations do not apply to the particular individuals who are included in the sample that they are studying due to the individual differences that exist among learners. In other words, research that is based on averaging covers or hides individual differences among learners. Consequently, Larsen-

Freeman (2018) offered recommendations for future research in SLA. She called for tackling SLA topics from a person-centered perspective by investigating the developmental path of each individual learner in the future studies. As stated by Alavi and Sadeghi (2017), SLA researchers usually ignore the individual level analysis that is represented in studying the individual language behavior. Accordingly, longitudinal studies are needed to investigate the developmental path of each individual learner. The longitudinal studies which explored the developmental path of individual learners over time are rare, which is considered a real gap in literature that needs to be filled.

The interpretation of the variability and the variation of the development path of the learners is that the language system consists of different subsystems: morphology, phonology, syntax, and so on (De Bot et al., 2007). According to De Bot et al., these sub-systems do not develop simultaneously for each learner. In other words, the language sub-systems are usually in a competition. De Bot et al. argued that these sub-systems or variables interrelate over time resulting in a dynamic language system. In other words, the progression in one aspect in the language may lead to the regression of the other. Sometimes, learners are not able to pay attention to both form and meaning at the same time; thus, they focus on delivering the message or the content at the expense of the form (Skehan, 1996). During the writing process, most of the students concentrate on generating ideas, and they do not often pay attention to their linguistic or grammatical accuracy, that is their sentence structure, punctuation marks, and spelling. At the same time, most of the students, who have not mastered the English language yet, may give priority to the accuracy of their content at the expense of trying complex language because they are incapable of writing complex and accurate sentences at the same time as complex structures or multi-embedded sentences may increase the frequency of their grammatical errors.

The aim of the present study is to understand the nature of the

SLA process with regard to the L2 writing skill by following the writing developmental path of 10 individual Egyptian EFL learners in terms of syntactic complexity, accuracy, and fluency (CAF) over one academic year to come up with the developmental patterns that show how learners develop their English writing skill. The study, furthermore, aims at explaining the nature of the developmental process of English writing by exploring the correlation among CAF over the academic year. It attempted to answer the following research question:

1. How does the L2 academic writing develop for a sample of Cairo University Egyptian EFL students?

   This main question was broken down into the following research sub-questions:

   a) How do complexity, accuracy, and fluency (CAF) develop for a sample of Cairo University Egyptian EFL students over one academic year?
   b) How do complexity, accuracy, and fluency (CAF) correlate with each other over one academic year?

Theoretical Background on Second Language Acquisition

This section reviews the theories which deal with how learners acquire the second language starting from Krashen's (1982) *acquisition-learning hypothesis* to De Bot et al.'s (2007) *complex dynamic system theory* (CDST).

Acquisition-Learning Hypothesis

In the 1980s, the field of SLA witnessed the development of Krashen's *Monitor Theory*, which includes five hypotheses; one of them is the *Acquisition-Learning Hypothesis*. Krashen (1982), in his theory of language acquisition, has differentiated between acquiring and learning a language. Acquiring a language is unconscious and natural, which is different from learning it. In his view, acquiring language occurs informally in natural settings, whereas learning occurs formally in classrooms. According to Krashen (1982), errors in students'

performance can be related to their insufficient acquisition of language, which does not mean that they do not "know about" the rules of the language (p.10). It means that they have not acquired them yet despite the fact that they have learned these structures through conscious instruction. Although Krashen's (1982), *Monitor Theory* has played a significant role in promoting the development of the SLA theory and teaching. In the 1990s, modern SLA research turned to cognitive approaches. The most important model in the cognitive approaches was Ellis's (1997) computational model.

Cognitive Approaches to SLA

According to Ellis's (1997) computational model, the learning process takes place in three stages. After learners receive L2 input, the features of L2 input become stored in their short term memory and then after being processed, they turn from explicit knowledge being learned consciously to implicit knowledge that is acquired unconsciously. This knowledge is then stored in the learners' long term memory. At last, the learner uses this implicit L2 knowledge to produce L2 output. In the 2000s, as a challenge to the premise claimed by the cognitive approach that maintains that SLA is a linear process, and that its developmental pattern is predictable, De Bot et al. 's (2007) CDST to SLA emerged.

The Complex Dynamic System Theory (CDST)

According to De Bot et al.'s (2007) CDST to SLA, language development is dynamic. It is neither linear nor predictable. According to the CDST, the language system is characterized by periods of variability and other periods of stability. A number of interrelated components undergo changes for each individual learner over time (De Bot et al., 2007). These interrelated components are complexity, accuracy, and fluency (CAF). According to De Bot et al.'s CDST, the change in one component may cause a change in the whole system thus producing a messy dynamic complex language system. This theory is by some means related to Skehan's (1996) *Limited Capacity Hypothesis*. Individuals cannot develop complexity, accuracy, and fluency concurrently due to

their inadequate capacity to pay a full attention to all of them equally when producing the language. In other words, there might be a tension among complexity and accuracy, and fluency. Students might prioritize fluency, that is, meaning and content, over accuracy or vice versa. They might also prioritize accuracy at the expense of producing complex language in order to avoid making errors.

Empirical Longitudinal Case Studies on L2 Writing Development

Hokamura (2018) investigated the English writing developmental path of two female Japanese first-year university students of different English proficiency over one academic year (10 months). Each student was required to complete 20 essays over the 10 months. The findings demonstrated that the two learners were completely different in their developmental paths. They also showed nonlinear trajectories in their development for all variables of CAF. For one case, complexity indicated little variability for one student only. For the other student, complexity showed initial little variability which was followed by high degree of variability. The high degree of variability was represented in progression followed by regression. For fluency and accuracy, the developmental paths were characterized by ups and downs all through for the two learners. For one student, the rolling correlation coefficient between accuracy and fluency remained negative throughout the study. However, the correlation between fluency and complexity shifted from negative to positive. For the other learner, unlike the other case, the rolling correlation between fluency and complexity shifted from positive into negative. The correlation between fluency and accuracy changed from negative to positive.

Alavi and Sadeghi (2017) investigated the writing developmental path of CAF over four months for 12 EFL learners, ranging in age from 15 to 17. They were of different proficiency and gender: 6 participants at the upper intermediate level (3 male and 3 female) and 6 participants at the pre-intermediate level (3 males and 3 females). The pre- and upper intermediate participants were shown a pictorial sequence of events

showing a story to write a narrative based on those pictures. After two months, the participants were asked to write a story about the same pictures once more. These procedures were repeated again after two months. Therefore, data were collected three times from students over the four months. The results revealed that there was no universal pattern of development among different learners with different proficiency or gender, which emphasizes no effect for gender or proficiency on the writing developmental trajectory. For all CAF elements, regression was followed by progression for some students. For others, progression was followed by regression. Some students progressed all through while others regressed all through.

Rosmawati (2014) examined the development of complexity and accuracy in ESL academic writing over one academic semester (four months) of one advanced 32-year-old Japanese learner of English during her postgraduate study in Australia. Ten written argumentative texts were collected from the learner. The results suggested that both complexity and accuracy displayed the characteristics of a dynamic system. Complexity progressed, regressed, stabilized somehow, and then progressed slightly. For accuracy, it regressed, progressed, regressed, progressed again, and then stabilized. The correlation results shifted from a negative in the beginning to a positive one finally.

De Groot (2012) followed the L2 writing developmental path in terms of CAF of one pre-intermediate female Thai student over a period of four weeks of intensive exposure to English input. Written texts were collected twice a week from the student. The findings of the study showed that all components of CAF exhibited high variability as well as stability over the four weeks. The pattern of accuracy reveals variability (ups and downs), followed by stability until the end of the observations. The pattern of complexity is characterized by variability before a peak in the development that is followed by major regression. The pattern of fluency was characterized by variability throughout. Correlation between complexity and fluency was found to be negative initially and positive

afterwards. However, the interaction between accuracy and complexity was found to be negative throughout. High peaks in complexity resulted in low accuracy scores.

As can be seen, longitudinal case studies are few. Most of the longitudinal studies were carried out on the group average level without paying attention to the individual differences among learners. In some studies, the participants' proficiency level was not identical, which might have affected the results by causing variation among the individuals with regard to their developmental trajectories (Hokamura, 2018). In some of the previous studies, the writing tasks were untimed which might have influenced the results of the study because the time that each participant spent in writing might not be equal (Alavi & Sadegi, 2017; Rosmawati, 2014). The writing tasks were accomplished at home, and learners had access to the internet (Rosmawati, 2014). Therefore, they might have plagiarized, and thus, their written texts might not have represented their actual level of proficiency. In some studies, there was a very short time duration between writing topics that is 3 days, which makes it improbable for showing variability (De Groot, 2012).

The duration of some studies was not long enough for a longitudinal study (one month) (De Groot, 2012). No feedback was given on the student's writing during the period of data collection. No development can occur without taking feedback. In the Arab or the Egyptian context in particular, to the best of the researcher's knowledge, no longitudinal case studies were conducted to explore the nature of EFL learners' writing development.

Design

The design of the study is mixed, i.e., both qualitative and quantitative. It is a non–experimental exploratory design. The study explored the writing development by tracing the developmental path of each individual student of the ten cases 11 times over the academic year. The study also investigated how complexity, accuracy, and fluency

correlate over time. This research is considered a longitudinal multiple-case study because it was carried out on a small sample size of individual learners (10) for the purpose of focusing on each case closely rather than calculating the average score of the sample. In other words, unlike cross sectional studies, the average score of the whole sample in the present longitudinal study was not calculated. Commonalities and differences among the ten students in the sample were highlighted, as a result.

Participants and Setting

The participants of the study were 10 freshmen (first year) university Egyptian EFL students (10 female). The students were enrolled in a class in the Department of English language and Literature, Faculty of Arts, Cairo University. The class the researcher taught included about 40 students. The number of participants in the sample (10) was sufficient since the aim of the study was not to study group averages but rather to focus on individual level analysis by tracing the developmental path of each individual student of the ten cases over one whole academic year for uncovering the individual variation in the sample. The researcher chose the students who were all Egyptians and of nearly the same proficiency level. A convenience sampling technique was implemented.

Students in all classes/ sections have to meet the Department entrance criteria in the first place; they have to get not less than 48/50 in English at high school. In addition, a proficiency admission exam, which is similar to the TOEFL Test in the design and criteria, was administered at the beginning of the academic year for all the students who were admitted to the English Department for the purpose of determining the students' level of proficiency. The test was out of 750. The students had to get not less than 500/750 to be able to join the department. The scores of the 10 students selected for the study ranged from 565 to 582 out of 750 in the proficiency test. The coefficient of variation (CV) for the scores of the ten students in the proficiency test was 1.1%. The standard deviation is 6 indicating a low percentage of discrepancy in the scores

among the cases. This suggests that the proficiency level of the ten cases was relatively homogenous. See Table 1 for the Description of the ten cases.

Table 1

Description of the Ten Cases of the Present Study

Codes for the Cases	Age	School	Total score/750	Travelling abroad before & taking English courses
AD.KH	17	Language	565	NO
AY.FE	19	Language	572	NO
SA.SA	18	Language	570	NO
SH.ME	19	Language	581	NO
ME.KA	17	Language	566	NO
NA.TA	18	Language	571	NO
HA.IS	18	Language	575	NO
HA.HO	18	Language	568	NO
SE.RA	18	Public	580	NO
HAG.IB	18	Language	582	NO

As shown in Table 1, students were given codes to avoid mentioning their names in the research for the sake of academic integrity. The researcher chose freshmen to be the sample of the study because the writing course is extended for one whole academic year for first year students in the English Department. Students took writing in both the first and second semesters. Thus, the researcher taught the same section in both semesters to be able to trace the students' developmental paths over one academic year. At the same time, the writing tasks that were administered in class were part of the participants' curriculum (writing course). The students received six hours of writing instruction per week

in the first semester: two sessions per week. In the second semester, they received four hours of writing instruction per week: two sessions per week for the writing course. Accordingly, the total number of hours they received over the academic year was around 110 hours (6 hours x 11 weeks= 66 hours in the first semester + 4 hours x 11 weeks in the second semester= 110).

Instruments Used for Data Collection

*Writing Topics (*Appendix A*)*

11 expository as well as compare and contrast writing topics were used for the data collection process. The rationale for choosing expository as well as compare and contrast topics is that these writing genres are part of the course/ curriculum. The topics were taken from the course book Oshima and Hogue's (2017) *Longman Academic Writing Series* book as well as the internet. The topics were agreed upon by the six teachers who teach the six sections of the First-year writing course in the English Department. The teachers chose topics which elicit data from students with no demand for background knowledge because the topics were of interest to them, relevant to their lives, experience, and age. (See Appendix A for the writing topics).

Data Collection Procedures

As seen in Table 2, data collection procedures administered in the present study lasted for one academic year (six months), i.e., October, November, December, February, March, and April. Procedures started in October 2019 and ended in April 2020. Accordingly, over the six months, the written texts were collected 11 times over the academic year.

Table 2

The Time Frame of the Writing Topics

Months	Writing Topics assigned
OCT	**T1**
OCT	**T2**
NOV	**T3**
NOV	**T4**
DEC	**T5**
FEB	**T6**
FEB	**T7**
MAR	**T8 (online)**
MAR	**T9 (online)**
APR	**T10 (online)**
APR	**T11 (online)**

First Semester

The curriculum of the course was based on Oshima and Hogue's (2017) *Longman Academic Writing Series* book. The students were taught how to write a paragraph as well as an essay. The students were taught sentence complexity in terms of types of clauses and sentences, that is independent and dependent clauses, simple, complex, compound, compound-complex sentences, and stringy sentences, i.e., using more than two coordinators in one sentence. They studied sentence problems, i.e., word order, missing elements, such as missing prepositions or definite and indefinite articles, fragments, choppy sentences (non-coherent sentences), run-on sentences and comma splice errors, and non-parallel sentence

structure. Problems on the morphological level, i.e., wrong verb tense, wrong word form (using the wrong part of speech), subject verb agreement, and wrong plural nouns were illustrated. They studied vocabulary/ lexical choice that is the inappropriate use of a word that makes the writer's intended meaning to be unclear or misinterpreted. Punctuation marks, such as the use of full stop, comma, quotation marks, colon, and semi-colons were also explained.

- The teacher and the researcher were the same person.
- Students were given 20 minutes to write the expository paragraph within the classroom session.
- Students were not allowed to use a dictionary while writing.
- Paragraphs were collected twice a month to leave a window for variability in the written performance of the student and to give the researcher enough time to grade the texts and give the students feedback.
- The researcher took one week to grade the students' paragraphs to be returned with feedback before writing on the following topic.
- The feedback was given on the students' grammatical mistakes of their paragraphs, i.e., stringy sentences, fragments, parallelism in structure, choppy sentences, run-ons, and comma splices, and all items covered, i.e., subject verb agreement, wrong verb forms, wrong word form, wrong plural nouns, lexical choice, and mechanics, i.e., capitalization, spelling, and punctuation errors.
- Students were also given feedback on their paragraph complexity, i.e., use of coordinators and subordinators, i.e., repetition of *and*, *so*, and *but*, use of adverbial conjunctions, use of relative pronouns and other subordinators, such as *though, although, since*, and so on.
- Students were advised to maximize complex sentences and

minimize compound ones in their texts.

- Students were given feedback with regard to the fluency of their texts, that is the length of their texts as the students were expected to write a paragraph of about 150-250 words; accordingly, they were given remarks on the sufficiency and the relevance of their ideas and supporting details.
- The teacher provided consistently balanced feedback addressing complexity, accuracy and fluency for every single topic for every single student.
- The researcher gave feedback individually and collectively to the students.
- The researcher gave feedback collectively by designing proofreading exercises from the students' paragraphs. Models of English paragraphs were displayed to the whole class.
- The researcher gave feedback individually by giving about 5 minutes of feedback for each student individually in the last hour in the session because the classroom session was 3 hours long. The teacher also gave feedback in her
- Therefore, all the 40 students of the classroom were given feedback individually throughout the whole week (two sessions).

Second Semester

- The second semester started in the second week of February. In the second semester, an essay was collected from each of the ten cases twice a month.
- They were given 60 minutes to write a four-five essay.
- The essays were collected online from the students because during Covid-19 pandemic; in 2020, classes were held online beginning from the middle of March 2020 till the end of the academic year. As a result, the researcher asked the students to perform the writing task online.
- The students were given the same duration of the face-to-face class

(1 hour) to accomplish the writing task.

- Students were asked to send their written texts to the researcher's email or WhatsApp after the time allotted (60 minutes).
- The researcher, thus, tried to equate the conditions of the face-to-face classroom to those of the online one by asking the students at the end of the online session to take 60 minutes to write the essay.
- The researcher also asked the students to write the texts manually to avoid the automatic correction of the Microsoft word. Hence, the students wrote the texts manually and took photos of them using their mobile cameras, and then they sent them to the researcher.
- The researcher gave feedback online in many ways by conducting zoom meetings, sending voice messages via WhatsApp, and sending written feedback.

Data Analysis Procedures

The total number of the collected texts is 110. The participants' written texts were analyzed quantitatively in terms of syntactic complexity, accuracy, and fluency. Foster and Skehan (1999) defined accuracy in terms of "the ability to avoid error in performance, possibly reflecting higher levels of control in the language" (p. 96). In this study, accuracy is operationalized in terms of the number of errors subtracted from the total number of words divided by the total number of words. For example, if the student writes 200 words and makes 30 errors, his accuracy will be calculated as follows: 200-30= 170/200=0.85. His writing accuracy will be 0.85, which means that 85% of the text is correct, that is, error free.

Complexity is defined as "progressively more elaborate language and a greater variety of syntactic patterning" (Foster & Skehan, 1996, p. 303). It means producing complex or advanced language that is represented in the high percentage of subordinate clauses in the text. Hence, in this study, syntactic complexity is operationalized in terms of the ratio of clauses to T-units. If the student writes a total of 20

independent and dependent clauses and a total of 10 T-units, then his writing complexity will be calculated as follows: 20/10=2. The T-unit is the independent clause.

Fluency is defined as "the number of words a writer is able to include in their writing within a particular period of time" (Wolfe-Quintero et al., 1998, p. 14). In this study, fluency is operationalized in terms of the number of words produced per minute. For example, if the students are expected to write 200 words in 20 minutes, then their fluency will be calculated as 200/20=10. Beginning from the second semester, the students began to write a five-paragraph essay (introduction, two-three body paragraphs, and conclusion). For the essay, students were allotted 60 minutes. Accordingly, the fluency of the essays that were written in the second semester were calculated in terms of the number of words produced in the essay divided by 60. When the researcher felt confused about how to count a certain word, she wrote it on the Microsoft Office word to check whether it is counted as one or two words. The researcher as well as the raters counted the number of words included in the essay after deleting irrelevant and repeated ideas or words from the paragraphs and essays.

Raters and Inter-rater Reliability

In order to ensure reliability in coding the data, the researcher asked two independent raters, who are PhD candidates, to score 30 (30%) out of the 110 written texts. Inter-rater reliability was calculated for fluency, accuracy, and syntactic complexity using the intra-class correlation coefficient (ICC). The ICC was used rather than ordinary correlation as more than two raters were included in rating the same data: the researcher and another two independent raters. The ICC was 0.98 for writing fluency and 0.97 for both accuracy and syntactic complexity. Accordingly, there is a positive correlation among the three raters and no significant difference was found among them. In case of discrepancy among the raters which occurred very little, the researcher calculated the

average of the three scores given by the three raters by adding each of them and dividing the total sum by three.

To answer research question 1a, after analyzing the written performance of each individual participant linguistically in terms of CAF, the individual data of each of the CAF were plotted in line graphs of Excel spreadsheets to detect variability in performance. Longitudinal Cluster Analysis was also conducted using the SPSS program in the Institute of Statistics, Cairo University to group the similar writing developmental patterns together and separate those which were different. Cluster analysis is an exploratory technique that divides participants into different clusters based on commonalities among them.

To answer research question 1b, three-window *rolling/moving Correlation* (R) was used to examine the correlation (R values) among CAF scores over the six months. The function of the *three-window Rolling Correlation* is to give information about the correlation among variables at different data collection points (longitudinally) to detect the change in correlation over time. Moving correlation analysis is a widely used technique in CDST studies. Compared with static correlation analysis, moving correlation analysis is more informative for showing the changes in correlation.

The *Rolling Correlation* measures the correlation among CAF for each three topics for each case. It measured the correlation for the first, second and third topics (1-3), then second, third, and fourth ones (2-4), until it reached (9-11) to examine the shift or the dynamic relationship among CAF. Moreover, coloured tables using the *conditional formatting* aspect of the excel sheet were used to display the dynamics/shift in the correlation among CAF over the academic year. Three tables were presented; one for the correlation between fluency and accuracy, another for the correlation between fluency and complexity, and the third one for the relationship between accuracy and complexity. See Tables 3, 4, and 5.

Results

Results of Research Question 1a: How do complexity, accuracy, and fluency (CAF) develop for a sample of Cairo University Egyptian EFL students over one academic year?

Development of Complexity Over One Academic Year for the Students

The general findings of the study revealed seven patterns with regard to the development of complexity. They are as follows:

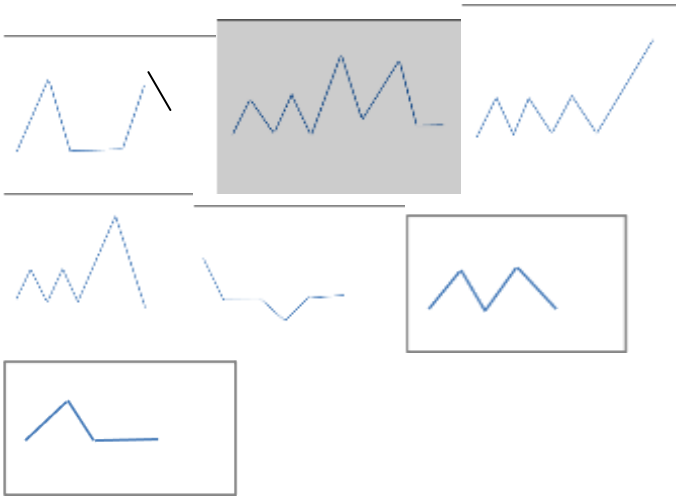

Figure 1

The Seven Developmental Patterns of Complexity

- The first pattern emerged for 2 cases (NA.TA and AD.KH)
- The second pattern emerged for 1 case (HA.IS)
- The third pattern emerged for 1 case (SH.ME)
- The fourth pattern emerged for 1 case (HA.HO)
- The fifth pattern emerged for 1 case (SA.SA)
- The sixth pattern emerged for 3 cases (SE.RA, AY.FE and HAG.IB)
- The seventh pattern emerged for 1 case (ME.KA)

As shown in Figure 1, the general findings of the study indicated

that concerning writing complexity, students underwent periods of ups and downs (progression and regression) and other periods of stability all through the year. For most of the students, progression is followed by regression except for SH.ME as she progressed finally as seen in the third pattern in Figure 1, unlike her colleagues who regressed finally after progression. NA.TA, too, progressed finally although she declined at the end but this regression was insignificant compared to her initial level as seen in the first pattern in Figure 1.

Development of Accuracy Over One Academic Year for the Cases

Four patterns were found for the development of accuracy in the present study. They are as follows:

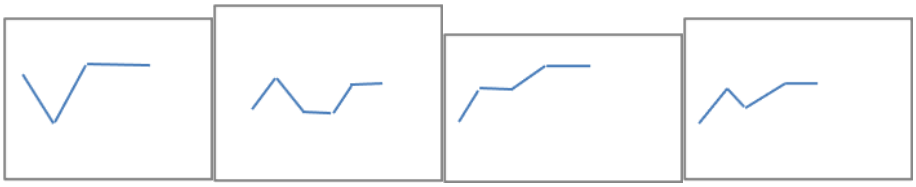

Figure 2

The Four Developmental Patterns of Accuracy

- The first pattern emerged for four cases (SA.SA, NA.TA, HA.IS, and SE.RA)
- The second pattern emerged for 1 case (HA.HO)
- The third pattern emerged for two cases (AY.FE and AD.KH)
- The fourth pattern emerged for three cases (SH.ME, HAG.IB and ME.KA)

The general findings vis-a-vis the development of accuracy revealed that the students experienced initial variability (period of ups and downs) followed by progression and then stability at the end. As shown in Figure 2, students progressed initially in accuracy. Only 30% (HA.IS, SE.RA, and SA.SA) regressed initially. However, after they regressed, they progressed and then stabilized. 50% of the cases were not

able to keep on after progression. They regressed, but they were able to progress again and stabilize finally. 20% of the cases stabilized after progression. For accuracy, by the end of the academic year, stability came after progression, unlike complexity, for which the students regressed after progression.

Development of Fluency Over One Academic Year for Each Individual Student

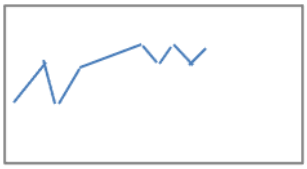

Figure 3

The Developmental Pattern Found for Writing Fluency

As shown in Figure 3, the general findings of the study revealed, with regard to fluency, that all the students experienced variability in the first semester followed by progression in the second semester starting from Topic 7.

Results of Research Question 1b: How do CAF correlate with each other at different time points over one academic year?

As presented in Tables 3, 4, and 5, the rolling correlation among CAF writing components was not static. It was dynamic because it shifted between positive, negative, and no correlation. The correlations among CAF influence the developmental patterns of the cases that were presented in the answers to the previous question.

Table 3

Three Window Rolling Correlations between Complexity and Accuracy (CA) for all the Cases

topics	AD.KH	AY.FE	SA.SA	SH.ME	ME.KA	HA.HO	HA.IS	NA.TA	SE.RA	HAG.IB
	CA	**CA**	**CA**	**CA**	**CA**	CA	**CA**	**CA**	CA	CA
1, 2, 3	0.1	0.65	-0.19	-0.13	0.82	-0.92	0.43	0.24	-0.99	0.76
2, 3, 4	-0.91	0.9	-0.98	0.56	-0.11	-0.98	-0.88	-0.32	-0.98	0.72
3, 4, 5	-0.28	0.11	0	-0.84	-0.72	-1	-0.16	-0.85	-0.86	-0.42
4, 5, 6	0.21	0.96	0.9	-0.74	1	n/A	0.05	0.6	-0.99	-0.95
5, 6, 7	0.87	0.6	0.9	0.34	0.82	N/A	0.99	-0.32	-0.93	-0.99
6, 7, 8	0.21	0.06	0.89	0.14	0.92	-0.87	1	0	-0.65	N/A
7, 8, 9	0.95	0.55	-1*	0.5	0	-1	1	0	N/A	0.63
8, 9, 10	0.98	0.5	-0.8	0.84	0	0.24	0.95	1	N/A	0.72
9, 10, 11	0.91	0.26	0.87	-0.99	-0.94	0.38	1	0.64	N/A	0.82

Note. Dark green (positive correlation). Dark red (negative correlation). Yellow and Orange (No correlation). N/A means that the correlation is invalid because one of the two components was stable which prevents any kind of correlation. AF is the correlation between fluency and accuracy. CA is the correlation between complexity and accuracy. CA is the correlation between complexity and accuracy.

Table 4

Three Window Rolling Correlations between Complexity and Fluency (CF) for all the Cases

AD.KH CF	AY.FE CF	SA.SA CF	SH.ME CF	ME.KA CF	HA.HO CF	HA.IS CF	NA.TA CF	SE.RA CF	HAG.IB CF
1*	-0.15	-0.9	0.68	0.88	0.15	0.76	0.79	0.68	0.76
0.88	-0.56	-0.95	0.9	-0.72	-0.03	0	0.23	-0.34	0.25
0.04	-1	0	-0.08	-0.9	-0.32	-1	-0.79	-0.99	-0.99
0.04	-0.2	-0.14	-0.74	-0.78	n/A	0.33	-0.41	-0.91	-0.34
0.98	0.71	0.1	-0.26	-0.43	N/A	0.96	-0.19	-0.69	-0.83
0.04	0.5	0.78	-0.57	0.96	-0.38	0.4	0	-0.18	-0.5
0.79	0.87	-0.7	1	n/a	0.8	0.48	0	0.44	0.76
0.89	1*	-0.97	0.66	n/a	1	0.09	0.55	n/A	0.24
0.08	0.56	0.83	0.84	0.77	0.96	-0.99	0.8	N/A	0.08

Table 5

Three Window Rolling Correlations between Accuracy and Fluency (AF) for all the Cases

AD.KH AF	AY.FE AF	SA.SA AF	SH.ME AF	ME.KA AF	HA.HO AF	HA.IS AF	NA.TA AF	SE.RA AF	HAG.IB AF
0.19	0.65	0.6	0.64	0.99	0.24	-0.26	0.79	-0.58	1
-1	-0.15	0.88	0.87	0.77	0.24	0.48	0.84	0.5	0.85
0.95	-0.03	-0.71	0.61	0.95	0.32	0.15	0.99	0.84	0.44
0.99	0.08	-0.57	0.91	-0.79	0.72	0.96	0.98	0.95	0.6
0.76	0.99	-0.35	0.82	0.17	0.58	0.99	0.99	0.9	0.78
0.76	0.9	0.98	0.73	0.99	0.79	0.4	0.22	0.87	-0.87
0.94	0.9	0.7	0.58	0.97	-0.76	0.51	-0.74	0.9	-0.02
0.96	0.58	0.93	0.15	0.65	-0.17	0.39	0.55	N/A	-0.5
-0.33	-0.65	1	-0.91	-0.51	0.63	-0.98	0.97	N/A	-1

For 30% of the cases (AD.KH, SA.SA, and NA.TA), all CA, AF, and CF correlations turned out to be positive after being negative initially especially for AD.KH who was able to create a balance or coordination very quickly. AD.KH's CAF correlations were characterized by lower degree of variability than those of the other cases. For the other two cases (NA.TA and SA.SA), the correlation was positive initially, but shifted to negative in the middle and returned to be positive again finally. For 70% of the cases (AY.FE, SE.RA, HA.HO, SH.ME, ME.KA, HAG.IB, and HA.IS), only one or two correlations have become positive finally. However, other correlations turned out to be negative by the end of the academic year.

Discussion

The findings concerning the development of complexity indicated that major progression or peaks are followed by regression. It was hard for most, if not all, of the cases to progress or stabilize after the peaks. This is because the process of development was still ongoing for the cases. Students have not acquired English subordination yet. The progression that they have achieved at some topics (usually one or two peaks) seems temporary. The peak they have achieved once or twice might have resulted from conscious learning (explicit learning) as well as the teacher's continuous feedback.

Student's consciousness has been raised with regards to the properties of the English language in the form of teacher's instruction and feedback regarding specific language features: subordinators, coordinators, and types of English sentences. Students were drilled on fixing stringy sentences by changing the sentences that contain more than two clauses and excessive coordinators into complex or compound-complex sentences.

Accordingly, since acquisition is unconscious, students have learnt the rules, but they have-not acquired them yet. This is reflected in the students' excessive use of "*but", "so",* and "*and''*. The students used

the subordinator "because" excessively. Although "*Because*" is a subordinator, the problem is that students' use of subordinators in the paragraphs is not varied. Subordinators, such as, *"since", "as", "so that", "in order to",* and "*for the purpose of* ", have been rarely used by the cases; the subordinator "*because*" has been repeated all through. An example of a student's paragraph sample to show the undue use of *but", so, because,* and *and* is the following:

There are many negative social consequences for being overweight. First, it can be difficult for them to interact with people in a society. For example, they find it hard to speak in front of other people ***because*** *they are often afraid of being bullied. Being overweight creates work-related or emotional problems,* ***and*** *they feel rejected from the society.* ***So****, they don't try to change* ***because*** *no one encourages them. They are often introverted,* ***and*** *they don't like to treat with people,* ***so*** *they don't make new friends. Their weight psychologically affects them* ***because*** *they always feel sad and stressed. Finally, people are affected by their weight.*

Another interpretation for the quick regression in writing complexity that has occurred after the peaks for the ten cases could be that students were affected by their L1 subsystem: the system of the Arabic language. Although subordination and coordination exist in both Arabic and English languages, subordination is likely to be more persistently utilized in the English language than the Arabic one (Othman, 2004). In view of that, excessive coordination that exists in the English texts of the cases of the present study is a result of language transfer. The L1 is there in the students' existing knowledge, and hence it controls their minds when writing in the L2 (English) (Meyer, 2008), which might have resulted in the increase of the percentage of coordination in their texts. This led to the decline in the number of embedded clauses in the students' essays. It is impossible to completely deactivate the L1 subsystem during the L2 writing process (Rosmawati, 2014). Students have returned to what is usually existent in their minds

which is the L1 (coordination).

Another reason for the regression of complexity after progression is that learners usually go through stages of making mistakes and self-correcting when they try to use complex structures, and this is because they have not mastered the English language structures yet (Verspoor et al., 2012). Accordingly, when these cases tried to use complex language, their accuracy regressed. Therefore, because of fear of making errors as a result of using advanced or sophisticated language, learners sometimes give priority to accuracy and compromise complexity.

The general findings vis-à-vis the development of accuracy indicated that all students' writing accuracy progressed; nevertheless, until progression, students underwent different paths, which emphasize the dynamicity and the uniqueness of the SLA process. For example, 30 % of the cases (SE.RA, HA.IS and SA.SA) regressed initially. A possible justification could be that these cases might have been disappointed or have felt frustrated when the teacher gave them feedback by making them aware of their errors. In other words, they might have lost confidence in their writing proficiency. These students might have been highly confident when they joined the English department, but after instruction and feedback, they might have been disappointed or frustrated, which might have hindered their performance. A shift occurred feedback and instruction enhanced their writing accuracy because this disappointment or loss of confidence might have urged them to work hard on their writing accuracy.

50% of the cases were not able to keep on after progression. They regressed, but they were able to progress again and stabilize finally. These cases were in need for more training and feedback to be able to unconsciously apply what they have learnt. This interpretation is supported in the repetition of some grammatical errors in these cases' paragraphs which demonstrate that their writing accuracy was in the stage of trial and error. They kept repeating errors with regard to subject verb agreement, fragments, punctuation, and so forth. Thus, their

linguistic accuracy was still developing. Other reasons could be that performance is context specific, and it fluctuates over time (Alavi & Sadeghi, 2017). In other words, during these months, students might have been rather tired, highly anxious, or extremely afraid of exams, which might have hindered their writing accuracy. They might have also exerted less effort during these months.

In contrast, 20% of the cases stabilized after progression which indicates that they only lacked knowledge of sentence problems and grammatical errors: fragments, choppy sentences, and stringy sentences. After being given explicit instruction of these aspects, they were able to apply on writing. The problem of knowledge is different from that of application. In other words, some students were able to apply knowledge faster than their colleagues. This is related to intelligence and aptitude, and this accentuates the idea of the interaction of different factors during the developmental process. Some students take much more time than their colleagues to acquire or apply knowledge.

The developmental path of fluency is common to a great extent among the ten cases. They all exhibited initial variability. Then they progressed significantly starting from Topic 7. Variability in the developmental path of fluency is associated with topic familiarity as well as the ability to express one's ideas smoothly. Accordingly, students might have been knowledgeable about some topics but not about others. Students are not the same with regard to their general knowledge or their ability to express themselves. At the same time, the student's psychological state when writing is not stable over time. Sometimes, the student might suffer from a writer's block which makes it hard for him/ her to generate ideas and write a whole paragraph or an essay in the allotted time. Despite the fact that students share many commonalities, such as their age, major, and educational background, they do not share the cognitive state, the same psychological or personality characteristics, or the same social context or life experience. These could be possible explanations for the variability in the developmental path of fluency in

the first semester.

The idea that their writing fluency improved beginning from semester 2 could be possibly a result of the maturation effect. Their ability to express their ideas in English might have improved as a result of training and writing on different topics and different writing genres. In addition, studying other courses throughout the academic year might have helped them improve their vocabulary and English structures. All the courses that are taught in the English Department are oriented towards improving the student's vocabulary and structures. They were exposed to authentic English input all through the academic year. They were also trained on doing presentations and reading a lot of English texts: novels, plays, short stories, poems, and other various types of texts.

Another possible reason could be that in the second semester, students wrote their essays at home during the quarantine (Covid-19 pandemic). Although the essays were timed, and the students were supposed to send them in the allotted time, this did not prevent them from getting some ideas from external sources, e.g., the internet. Although the teacher checked plagiarism and deleted all the copied sentences to determine the actual language proficiency of the students, students might have paraphrased or summarized ideas by writing them in their own words, and this was allowed under the condition of citing the source by giving credit to the author of the ideas. Therefore, getting ideas from the internet might have enhanced the student's writing fluency. All these reasons might have played a role in increasing the student's text length during the second half of the academic year.

Another justification for the emerging CAF writing developmental patterns is the inter-relationships between the different language sub-systems (de Bot et al., 2007). The results of the analyses of the rolling correlations demonstrated that for 30% of the cases, correlations among complexity, accuracy, and fluency turned out to be positive finally after being negative. For the rest of the students, only one or two correlations have become positive finally.

However, other correlations turned out to be negative at the end of the academic year. These findings are consistent with Skehan (1996) in that students were not able to concentrate on all CAF elements at the same time due to their limited attentional capacity resources that they have to distribute on all CAF writing components. While writing on the assigned topic, the students encounter a cognitive load. This cognitive load is represented in generating ideas for the topic and at the same time paying attention to the accuracy of their writing as well as using advanced language that is represented in using high levels of subordination/complexity.

Accordingly, a trade off effect might have occurred in the sense that one component went at the expense of the other; progression in one component might have led to the regression of the other. It could be that students were paying more attention to one aspect of the writing task, such as meaning or fluency, which might have gone at the expense of using accurate sentence structures or complex sentences. The students' act of taking risks and attempting new expressions by producing complex sentences might have led them to make sentence structure problems because of their inability to produce complex and accurate sentences simultaneously. Examples from the cases' paragraph samples are the following:

- *I consider him one of the most effective people in life who should everyone respect.* (Word order: who should be respected by everyone /who/whom everyone should respect)
- *Learning foreign languages make you able to travel around the world easily. As learning an international could help you travel and communicate*. (Fragment: the dependent clause is not attached to an independent one)
- *Although putting a child in embarrassing situations like calling them in bad names or making fun of his attitude can grow up a psycho.* (Fragment: the dependent clause is not attached to an independent one)

- *I have seen a lot of families living in dirty places how they treat their children.* (Word order: I have seen how a lot of families living in dirty places treat their children)

For this reason, some cases might have avoided writing multi embedded sentences to minimize syntactic errors and thus maximize the percentage of accuracy in their texts. However, the tradeoff effect started to vanish towards the end of the academic year for some cases. Students might have been familiar with the task of writing in English after taking feedback and receiving instruction and practice on sentence problems and sentence complexity, which might have enabled them to create balance among all CAF components and thus achieve progression in two or all of them simultaneously.

For the rest of the students whose CAF correlations shifted from positive into negative, a possible interpretation could be that these students' language systems were still developing. They encountered a challenge in distributing all their attentional limited cognitive resources among the three CAF components concurrently. For example, when two writing components progressed, the third one regressed and vice versa, as a result. Accordingly, their language system was characterized by dynamicity right through. This interpretation is supported by the CDST which claims that the language's dynamic system, interdependence of CAF components, trial, error, and self-correction, and the distributed attentional capacities are essential factors contributing to the different CAF developmental patterns (De Bot et al., 2007).

The findings of the present study were consistent with those of De Groot (2012), Rosmawati (2014) and Alavi & Sadeghi (2017) with regard to complexity and accuracy developmental patterns. This agreement could be justified by the idea that the students in the present study and in those of De Groot's and Rosmawati have not acquired subordination. The process of development was still ongoing for the cases. At the same time, students usually give priority to accuracy by not

taking risks of attempting advanced language that is represented in the use of many embedded clauses within the sentences. Therefore, in both studies, complexity regressed while accuracy improved finally.

The study's findings partially agreed with those of Hokamura (2018). The concurrence was for the complexity developmental pattern only. In Hokamura's, complexity showed little variability initially followed by high degree of variability, that is progression followed by regression, which was the case in the present study. The disagreement, however, was for accuracy and fluency because in Hokamura's study, fluency and accuracy showed variability all through, which was not the case in the present study. In the present study, most of the cases stabilized after progression in both accuracy and fluency. Students in the current study also experienced stability at some topics. This is attributed to the individual differences among cases.

The cases in the present study are different from those of Hokamura's. In Hokamura's, students had no experience in writing before, which indicates that they are beginners with regard to writing proficiency which might have resulted in the variability of their fluency and accuracy right through. On the contrary, in the present study, students have been learning English for 14 years. Another reason could be that unlike the present study, in Hokamura's, the students' essays were not graded, which might have demotivated students. Moreover, dictionaries were allowed, which might not have helped in reflecting the actual knowledge of the students.

Conclusion

It can be concluded from the findings of the study that dynamicity is the impetus power of language development (De Bot et al., 2007). Students did not progress right through. Neither progression nor regression could be predicted at any time in the academic year during the language developmental process despite the fact that the participants of the current study were of the same level of proficiency and gender and in the same EFL context. Each individual followed a

unique way of development, which was different from those of the others especially for complexity and accuracy. The patterns of complexity are different from those of accuracy and fluency. Accordingly, it was very challenging to come up with a universal pattern. For complexity, seven patterns out of 10 students were identified. Even these patterns include differences. The only generalization that could be made from all these patterns is that initial progression that is achieved by students, if any, is temporary. The language system of the student was still developing; hence, students do not usually keep on progressing.

Exposure to language input and teaching does not directly transform into grammatically accurate, fluent and highly complex language due to the interplay of many factors during the learning process, e.g., psychological factors. Another conclusion is that subsystems (CAF) compete against each other, that is, progression in complexity and fluency may lead to regression in accuracy because of the student's inability to distribute all his attentional capacity resources on all writing components. Maximizing complex sentences may maximize errors of sentence structure. Students may pay more attention to one language level than to the other. Later on, this tradeoff effect seems to disappear when the student gets familiar with the task of writing in English.

Pedagogical Implications

Tracing individual learners' developmental trajectories is pedagogically useful. One assessment session does not tell everything about a learner's proficiency. Longitudinal assessment is, thus, effective for the purpose of presenting pedagogical intervention. A pedagogical intervention was needed to push cases out of the stability or regression. Accordingly, teachers should accept instability and variability in development over time. They should be patient with their students. Teachers should be aware that CAF components do not develop correspondingly or simultaneously, and they sometimes

compete against each other until the student achieves satisfactory level of proficiency. Accordingly, pedagogical intervention should interfere to help students develop the three components concurrently as much as possible. Teachers, as a result, should encourage students to use complex sentences and overcome their fear of making mistakes.

Teachers, furthermore, can help students develop appropriate content for their writing topics. They can have discussions on the topics before writing or they can divide students into groups to brainstorm for the writing topics which may enhance writing fluency. Teachers can also provide students with authentic English input to alert them to the English texts' complex structures and make other linguistic forms salient. Teachers should be aware that one of the sub-systems which exist in the students' mind is the L1 sub-system. It is unfeasible to completely deactivate the L1 subsystem during the L2 learning process, and the transfer from L1 to L2 should be treated or perceived by teachers as a natural stage in the developmental process.

Limitations and Suggestions for Future Research

Although case studies give detailed findings and also take into consideration individual differences, these results are generalizable to specific settings and subjects. Consequently, in the present study, it can be cautiously assumed that general writing developmental patterns were found. Another limitation is that data were collected online in the second semester during the quarantine period of Covid-19 pandemic; accordingly, the conditions of collecting data in both semesters were not identical. In the first semester, students wrote within the classroom, but in the second semester, tasks were held online. Investigating the development of lexical complexity is required. The study can be replicated on the speaking skill as speaking is also a productive skill, and thus a challenging skill to be mastered. Larger samples covering longer periods of time would yield a more detailed and comprehensive picture in

future research.

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Appendix A

The Writing Prompts

First Semester

Students will have 20 minutes to write a paragraph of 150-250 words on each of the following writing topics:

1. Who is your role model and why do you consider him/her your role model?
2. Why is romantic love considered a poor basis for marriage?
3. Why should universities require every student to study a Foreign Language?
4. How can childhood shape adulthood?
5. What are the negative social consequences of obesity?

Second Semester

Students will have 60 minutes to write four to five paragraph Essay on each of the following writing topics:

6. How to minimize the negative effects of social media on people's lives?
7. Compare and contrast private and public universities/schools.
8. Compare and contrast rural and urban life.
9. Compare and contrast texting to face to face talking to friends.
10. Compare and contrast teachers now and in the past.
11. Compare and contrast online and traditional education.