CHAPTER IV
HybridNTELL MODEL AND RESEARCH FINDINGS

This section presents three phases of the research and development of HybridNTELL model. In the first phase, the HybridNTELL learning model was presented. In the second phase, the model was evaluated based on the students' response to the learning environment where it was implemented and students' development. Finally, due to the advancement of technology, further observation on students' performance was conducted through the online interaction kept in the archive. The observation offers concrete explanation on the phenomenon found in the evaluation process.

4.1 The sketch of HybridNTELL model

HybridNTELL model is the main product of this current study. It was created based on three interrelated areas of studies on learning: social constructivist theory, network technology-enhanced language learning, and foreign language learner autonomy, with an aim to foster foreign language learner development. Details of the theory inspired the HybridNTELL model development and the design of the model are given in Chapter III. In this chapter the sketch of HybridNTELL model is given as related to the research questions asked and the findings.

The following sketch of the HybridNTELL model is presented in three stages for *application* purposes. To ensure theoretical understanding, the first stage presents the key constructs for HybridNTELL environment design based on the three areas: social constructivist theory, learner autonomy and network technology-enhanced language learning. The second stage provides a guideline when taking the model into practice. The last stage suggests ways to assess learning outcomes in HybridNTELL environment.

4.1.1 Key constructs for HybridNTELL environment design

The first key construct that offers an overview of the learning process taken into account in HybridNTELL model is the *zone of proximal development*. As illustrated in Figure 4.1, the zone of proximal development (ZPD) is the distance between what learners can achieve by themselves (zone 1) and what they can achieve with assistance from others (helps). The skills that the individual has already mastered constitute his or her actual level. The skills that the individual can perform when assisted by a more capable person or some other means of mediation constitute the

potential level (zone 2). Thus, learnt skills provide a basis for the performance of new skills. When these skills in tern become autonomous and stable, a new zone (zone 3) can be created to make possible the acquisition of still further skills.

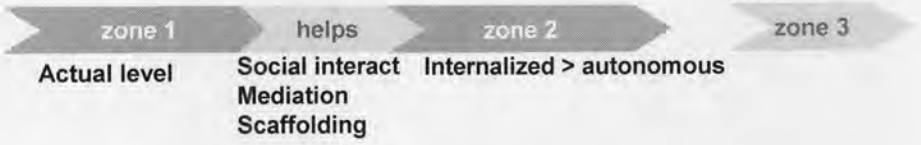


Figure 4.1 The zone of proximal development

Within the ZPD, four task types (see Chapter III) were designed based on the assumption that reactive tasks require less degree of autonomy than proactive tasks and interdependent tasks require less degree of autonomy than independent tasks. The assumption was drawn from two perspective of learner development: social constructivist theory and the concept of learner autonomy. From the perspective of social constructivist theory, the tasks are mediation. The four different task types mediate learning with teacher's scaffolding (reactive tasks) and collective scaffolding (interdependent tasks). However, independent and proactive tasks provide opportunities for learners to exercise further transferable skills. From the perspective of learner autonomy, the four task types hold different dimensions and degrees of learners' control over their learning. All four task types are considered equally crucial in the learning process.

Both perspectives offer the same bases for learner development. Reactive tasks offers direction from the teacher while for proactive tasks, the students create their own direction. Interdependent tasks require students to work collaboratively while for independent tasks, the students work alone. Based on the task description, Re-inter tasks are assumed to require less degree of autonomy. Re-inde, Pro-inter and Pro-inde tasks are assumed to require more degree of autonomy respectively. In classroom settings, tasks are the major influence of overall management and organization. They define the role of other factors in the learning environment. The related factors are illustrated in Figure 4.2 according to Engestrom's (1987) activity system rooted from the work of Vygotsky (1978) and Lientiev (1978). First, tasks inform whether *subject* is regarded as a person working individually or a group working collaboratively. Second, tasks notify whether *object* is the outcome of learner-directed or teacher-directed. Then, division of labor, community and rules are

assigned. In HybridNTELL model, *division of labor* is done through the stratified random assignment technique for interdependent tasks. Students are required to take control of the task when they do independent tasks. The mixed ability nature of the students in groups leads to an establishment of *community* of practice where each individual helps constructing knowledge for the community. *Rules* are designed to form direction and ways to assess learning outcomes (see Table 3.4).

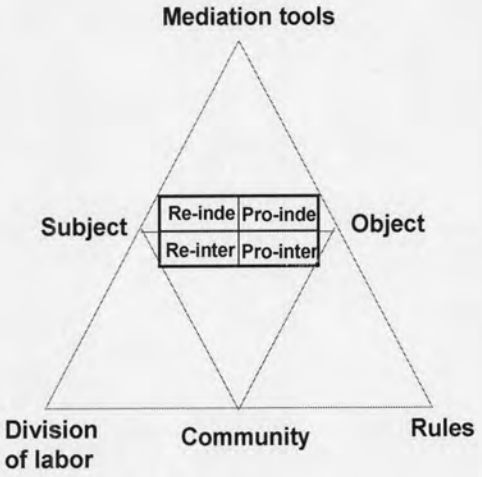


Figure 4.2 Application of activity system

Finally, selective use of mediation tools (Figure 4.3) is also influenced by task type. From the perspectives of learner autonomy study, there are six ways to foster learner autonomy (Benson, 2001) which are regarded as mediation tools in HybridNTELL environment.

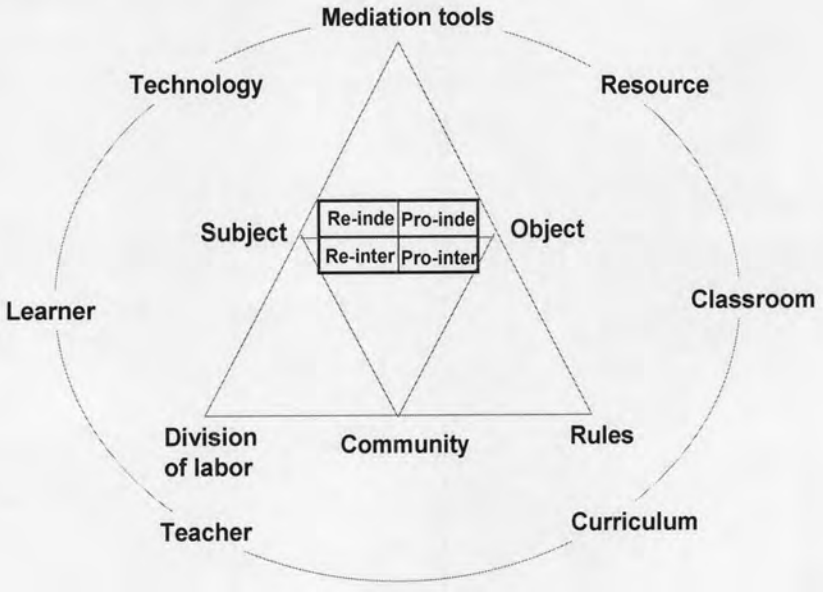


Figure 4.3 Application of mediation tools

In *resource*-based learning (assumed for all tasks), the focus for the development of autonomy is placed upon the learner's independent interaction with learning resources (e.g. textbook, websites, dictionary, etc.). This type of mediation offers learners the opportunity to exercise control over learning plans, the selection of learning materials and the evaluation of learning.

In *classroom*-based approach to the development of autonomy in HybridNTELL model (assumed for all tasks), students are provided with the opportunity to make decisions regarding their learning within a collaborative and supportive environment. In this case, *Objects* and *Rules* can be negotiated in class to reach mutual agreement. The adjustment is seen to be catered for the students' zone of proximal development.

Curriculum-based approach to autonomy in HybridNTELL model has been formalized in the idea of process syllabus, in which learners are expected to make decisions concerning the content and procedures of learning in collaboration with class and their teacher. This approach illuminates themes, tasks, and activities systematically arranged in HybridNTELL model to welcome any changes to be made.

Teacher's role in autonomous learning is described as facilitator who provides support for learning; counselor who gives advice in learning; and resource provider who possesses a source of knowledge and expertise. In words, the teacher in HybridNTELL model helps learners to plan and carry out their independent or interdependent learning by means of needs analysis, objective setting, work planning, selecting materials and organizing interactions (for reactive tasks). Moreover, the teacher helps learners to evaluate themselves (assessing initial proficiency, monitoring progress, and peer- and self-assessment).

Learner-based approach to autonomy (assumed for all tasks) focus on production of behavioral and psychological changes that will enables learners to take greater control over their learning. In HybridNTELL environment, students are fostered to take different degrees of control over different task types. Finally, they achieve to take greater control over their learning.

Finally, *technology*-based approach to the development of autonomy in HybridNTELL model (assumed for Pro-inter task) facilitates interactions that are difficult in foreign language classrooms. Network technologies provide opportunities for collaborative learning, interaction among learners, between learners and between

learners and teachers that could otherwise be difficult to achieve in the foreign language classroom.

4.1.2 Objectives of HybridNTELL model

There are two main objectives of HybridNTELL model. First, the model aims to foster the four dimensions of autonomy in English as a foreign language learners. Second, the model aims to facilitate learners' language development.

4.1.3 Context of application and technical requirement

Although those six mediation tools require equally careful organization, the design of technology application needs further description. It is noted that the following is the requirement for this specific context of the current study of HybridNTELL model. Adjustment can be made in other contexts.

Context of application. Classes are composed of 40-50 students with one teacher. Almost every student and all teachers are computer literate. Network technology is accessible to the majority.

Infrastructure requiremenst. 20 multimedia computers connected to the LAN and the Internet are used for collaborative work. Each group of five or six works on two computers. An LCD projector connected to one computer (preferable the teacher's computer) is used for presentation.

System requirements. A learning management system (e.g. Moodle, WebCT, Blackboard) with online database is used to create the online learning platform (see Appendix E for system installation procedure).

4.1.4 Procedure for implementation

A face-to-face meeting takes place every week for 3 hours: 90 minutes on Tuesday and 90 minutes on Thursday. In the first seven weeks, a series of orientations are delivered (see Table 3.6). Then, the HybridNTELL tasks were implemented in the next nine weeks (see Figure 3.10). The use of technology-enhanced language learning provides more contact hours and flexibility in the online learning environment.

4.1.5 Methods for assessing HybridNTELL outcome

In HybridNTELL model, learning outcomes are assessed from social constructivist perspective. Thus, the assessment takes into account the students' zone of proximal development in which the goal is to foster learner autonomy. The procedure of assessment is not only a pre-posttest but a set of multiple procedural tests. First, objective language proficiency test are administered before the beginning and after the end of the course. Second, the holistic performance on the four task

types is assessed based on the criteria (see Table 3.4). Third, objective language development is measured based on three major categories corresponding to different aspects of development: (1) fluency; (2) accuracy; and (c) complexity (both grammatical and lexical); as well as any focused language function based on curriculum. Finally, curriculum-based achievement is measured.

4.2 An evaluation of HybridNTELL model

Through the perspective of social constructivist theory, the HybridNTELL model was developed and evaluated to ensure its effectiveness based on the aforementioned four research questions. The results show that the model enhanced language learning opportunity for all learners regardless of their previous language proficiency. Rather, degrees of autonomy play an important role in learner development.

Being aware that the experiment involves the students from three different classes, I ensured the homogeneity in effects from HybridNTELL environment by controlling the following variables: the teacher, the content, the sequence and methods of content delivery. The four questions involved the 90 students selected by random stratified method from the group of 143 students who received the treatment to test for statistical empirical evidence.

Four research questions guiding the design and experiment of the HybridNTELL model were addressed. The first three questions involved the tests to examine whether students' with different English proficiency levels had an equal chance to benefit from the model. The fourth questions aimed to study the effectiveness of the HybridNTELL model in terms of positive effects it provides in students' autonomy and language development.

4.2.1 Degrees of autonomy of students' with different English proficiency levels

The students' degrees of autonomy were measured based on their performance during the course on the four task types (see Table 3.4). The scores were acquired from the scale of 100 percent for each task type. Table 4.1 presents a summary of means and standard deviation of the students' scores on task performance. The students' scores were described based on their English proficiency levels measured before the beginning of the course (high proficiency group, moderate proficiency group and low proficiency group).

Table 4.1
A summary of means and standard deviations of the degree of autonomy demonstrated by students with different English proficiency levels

	M	SD
H (n=30)	72.44	10.93
M (n=30)	67.93	8.20
L (n=30)	63.47	14.79

The students with high English proficiency showed the highest degree of autonomy in learning EFL ($M = 72.44$) while those with low proficiency showed the lowest degree ($M = 63.47$). However, the standard deviation of the low proficiency students ($SD = 14.79$) is far greater than those with high ($SD = 10.93$) and moderate ($SD = 8.20$) proficiency levels. The greater standard deviation suggests that there are some students with low English proficiency who developed higher degree of proficiency than the mean scores. On the other hand, some students in the low proficiency group demonstrated far lower degree of autonomy than the mean scores. The moderate proficiency group appears to have the smallest range of diversity ($SD = 8.20$). The standard deviation suggests that the members of the moderate proficiency group, some of whom developed their autonomy as far as some members in the high proficiency group. However, they did not demonstrated as high range of development as some members in the low proficiency group.

Table 4.1 only offered an overview of the students' degrees of autonomy from which no inference can be made. To test whether the students' degrees of autonomy were different significantly among three English proficiency groups, the between-group one-way analysis of variance (ANOVA) was conducted. Although the descriptive statistics appears to show some differences between the three groups, the results from F-test did not yield any significant difference among the groups, $F(2, 87) = 3.36$, $p = .76$. The difference between the groups was due to other factors rather than their previous proficiency levels measured before the beginning of the course. The results rejected the first hypothesis indicated a significant difference among the proficiency groups. The students' previous English proficiency levels appear to have no significant influence on their degree of autonomy as indicated in the past literature. The results encouraged a search for any more likely factor influencing the students' degrees of autonomy demonstrated when learning with the HybridNTELL model.

4.2.2 The students' degrees of autonomy in different task types

The students' degrees of autonomy demonstrated in each of the four task types were used to investigate whether different task types have different effects on the students' degree of autonomy. Table 4.2 gives a summary of the students' degrees of autonomy demonstrated in each of the four task types: reactive-interdependent type (re-inter), reactive-independent type (re-inde), proactive-interdependent type (pro-inter), and proactive-independent type (pro-inde). The mean scores and standard deviations involve all 90 participants.

Table 4.2
A summary of means and standard deviations of the students' degrees of autonomy demonstrated in different task types

n = 90	M	SD
Re-inter	79.41	9.41
Re-inde	66.42	15.48
Pro-inter	66.75	16.94
Pro-inde	59.21	20.07

The mean scores indicated that Pro-inde was the most difficult task to achieve ($M = 59.21$) and the students demonstrated the least degree of autonomy. In contrast, Re-inter appeared to be the far easiest task to achieve ($M = 79.41$) and the students seemed to have more control over their learning in this task type. The mean scores in Re-inde ($M = 66.42$, $SD = 15.48$) and Pro-inter ($M = 66.75$, $SD = 16.94$) types show almost similar degrees of difficulty although the nature of the task types are far different. In Re-inde type, the students were assigned to work alone while in Pro-inter, they worked in groups. However, the two task types shared similar trait in that in Pro-inter, the students were also required to show individual accountability in the group work before they received help from the group members and the teacher. A major difference between the two task types is that for Re-inde type, the students reacted to the direction-given assignment while for Pro-inter type, the students were required to set their own direction and resource, and worked towards the goal. Thus, further investigation into their performance and development was conducted (see 4.2.4)

The major focus of the second research question is the difference each task type offers to foster EFL learner autonomy. The within-group one-way ANOVA was used to analyze whether there is any significant different effects the four tasks have on the students' degree of autonomy. The results indicated no significant difference among the effects from four task types on the students' degree of autonomy, F (2, 87)

= 6.71, p = .52. The second hypothesis was also rejected. The four task types failed to yield different effects on the students' degree of autonomy as it appeared in Table 4.2.

4.2.3 The interaction effect of task types on performance of students' with different English proficiency levels

The two main effects: previous English proficiency levels and task types failed to yield significant difference. However, there is a third possible effect for it is conceivable that whatever the effect of different task types on the students' degrees of autonomy, it may not be the same for the students with different English proficiency levels. The third research question aimed to examine whether the students' degrees of autonomy tend to increase or decrease with any of the four tasks which may not do so at the same rate for the students with different English proficiency levels.

The results from 3 x 4 factorial ANOVA indicated an interaction effect between the students' English proficiency levels and task types on the students' degree of autonomy, F (6, 87) = 15.96, p < .001. Figure 4.4 presents the plot of the interaction effect found.

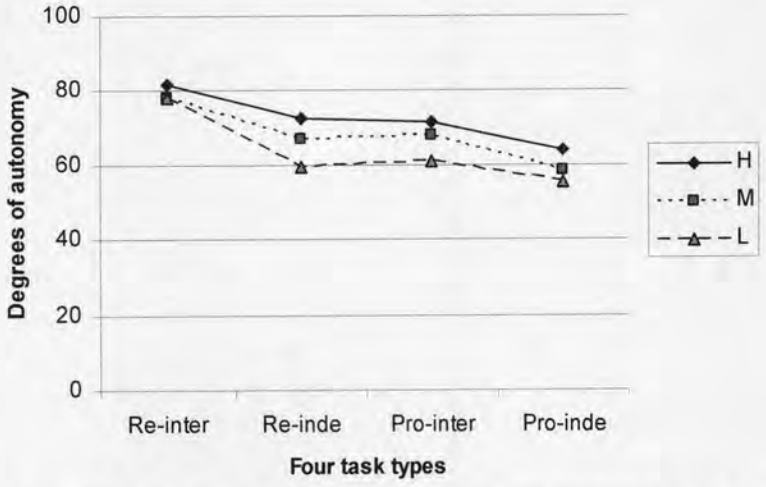


Figure 4.4 An interaction effects between students' previous English proficiency levels and the four task types on their degrees of autonomy

Different task types appeared to have different effects on the degrees of autonomy students in different English proficiency groups demonstrated.

The Re-inter task type showed a less effect on distinguishing the students' different degrees of autonomy. The less effect is partly due to the nature of the task type which encouraged the students to collaboratively work towards the shared goal. The results suggest that Re-inter type has an equal chance to either encourage the students with all proficiency level or hinder accountability of any individual. Some group members might not participate fully in the task but acquired the same scores as

those who fully work hard to accomplish the task. Thus, Re-inter type produced a smallest standard deviation (*SD* = 9.41).

The Re-inde task type yields the most significant effect on the degrees of autonomy the students with different English proficiency demonstrated. The students were required to work alone towards the direction-given task. The results showed that the students with higher English proficiency level had better control over Re-inde task type since the task accomplishment relies on language resource the students possess.

The Pro-inter task type appears to encourage a higher degree of autonomy the students demonstrated. The students with moderate English proficiency level seemed to show the higher degree of autonomy more closely to those with high proficiency level. The students with low English proficiency level, although demonstrated more control over Pro-inter task type than Re-inde type, show lesser degree of autonomy in Pro-inter task type.

The Pro-inde task type frustrates the students with all English proficiency levels although the Pro-inter task does in opposite comparing to the Re-inde. The students appear to have more control over the Pro-inter than the Re-inde while they have less control over the Pro-inde. The two type of proactive tasks yield far different results which requires further investigation. The difference in the degree of autonomy of the moderate English proficiency group towards the two proactive task types is interesting in that the Pro-inter type encouraged them to have high control over their learning more closely to the high proficiency group while the Pro-inde frustrated them to have less control over the learning more closely to the low proficiency group.

The general difficulty the Pro-inde type offered the students might be due to such other factors as their experience and culture. From a personal conversation with Dr. Sudaporn Luksaneeyanawin (March 21, 2007), Thai students in the primary and secondary education system have less opportunity to conduct, reflect and monitor their learning process which are the main focuses of the Pro-inde task type due to large class size and teacher-based instruction approach. As a result, the Pro-inde appeared to be the newest task type which some students might have less experience on. The greatest standard deviation (*SD* = 20.07) in Table 4.2 also indicated a diversity of the students' degree of autonomy demonstrated in this task type. This interesting phenomenon on Pro-inde task type was further investigated in the next section on students' language development.

4.2.4 The students' language development

The above investigation indicated that the students' previous English proficiency levels and task types are not the main effects of the students' degree of autonomy demonstrated in their learning with the HybridNTELL model. Thus, we can assume that the students have an equal chance to develop their EFL learning autonomy in the HybridNTELL environment. There is an interaction effect found between the students' previous English proficiency levels and task types. The two main effects requires a further examination on the extent to which those tasks in the HybridNTELL model along with the organization of the environment benefit the students' autonomy and language development.

The fourth question mainly aimed to test the effectiveness of the model after the implementation by examining the students' improvement of English proficiency, curriculum-based achievement, holistic analysis of autonomy development through task performance, and objective analysis of language development in task performance. The results show that students' development is related to the HybridNTELL model in that students' with high achievement and proficiency responded better to the tasks.

4.2.4.1 Improvement in English proficiency

The total of 90 students (see 3.2.3) took Chulalongkorn University Test of English Proficiency (CU-TEP) as the posttest at the end of the course. Their CU-TEP scores at the beginning of the course (pretest) were compared with their CU-TEP scores at the end of the course (posttest). The results from the Paired-sample t-test indicated a significant difference between the students' pretest scores ($M = 454.18$, $SD = 41.66$) and their posttest scores ($M = 469.32$, $SD = 48.45$), $t = 12.90$, $p < .001$. This difference demonstrates that students' English proficiency improved overtime. Table 4.3 provides a descriptive summary of the students' pre-and posttest.

Table 4.3
A Descriptive Summary (means and standard deviations) of each group for pretest and posttest

	Groups	Mean	Max	Min	Range	Std. Deviation
Pretest	H (n=30)	504.73	547	480	67	18.85
	M (n=30)	447.80	473	428	45	13.63
	L (n=30)	410.03	417	390	27	9.08
	Total (n=90)	454.19				41.66
Posttest	H (n=30)	519.97	576	482	94	24.77
	M (n=30)	463.90	500	437	63	15.16
	L (n=30)	424.10	462	403	59	12.33
	Total (n=90)	469.32				43.45

Viewing the varied range of score from pretest to posttest, some students in the low proficiency group made a greater improvement reaching the same level as some students in the mid proficiency group. Also, some students in the mid proficiency group improved in the same range as or even higher than those from the high proficiency group. Some students in the high proficiency group made further progress to an even higher level (see Figure 4.4). Diversity of improvements was illustrated by each group's standard deviations. The standard deviations of the high proficiency group in both pretest and posttest scores are the widest. Those of the mid proficiency and the low proficiency groups are narrower respectively. The results appear to tell us that the high proficiency group remains to be more heterogeneous while the low proficiency group appears to be more homogeneous. Nevertheless, the low proficiency group shows a more increase in standard deviations than the mid proficiency group does.

It can be seen that the low and the high proficiency group show greater variation than the mid proficiency group while the development of the whole group in average is greater in the mid proficiency group.

Since each range of proficiency level is quite broad, improvement of the learners' English proficiency is not clearly shown. Thus, the scores of each English proficiency level is subdivided into narrower ranges based on 10 points on the score rank. The following table presents the improvement of the learners' English proficiency levels based on the narrower ranges and the Common European Framework Reference bands.

Table 4.4 explains the 90 students' development based on the Common European Reference Framework or CERF (see Figure 3.11). Based on the CERF ranges the students were divided into three groups at the beginning. After the experiment 20 students in the low proficiency group (A2 upper basic level) made good progress to the threshold level of B1. Five students with moderate level of proficiency progressed to high level of proficiency. Six students with B2 or upper intermediate level progressed to C1 or advanced level. Although the majority of students remained in the same level, many students made good progress within the ranges (according to the subdivided ranges in column 2 and 3 in Table 4.4). The students in high proficiency group (H) made different ranges of progress (H1-H7). The numbers after the letter H, M, L show the ranges of progress the students made 1=10 points.

Table 4.4 Detail of improvement of English proficiency

Level of proficiency (Pretest)	Pretest ranges (No. of students)	Posttest ranges (No. of students)	Level of proficiency (posttest)
	610-619		
	600-609		
	590-599		HH
	580-589		C1 (550-619)
	570-579	H7(1)	N = 6
	560-569	H5(1)	
	550-559	H6(1) H5(1) H4(1) H3(1)	
	H7: 540-549 (1)	-	
	H6: 530-539 (2)	H6(1) H5(2) H4 (1)	
H	H5: 520-529 (6)	H5(1) H3(4)	H
B2 (480-549)	H4: 510-519 (2)	H3(1) H2(1)	B2 (480-549)
N = 30	H3: 500-509 (10)	H3(2) H2(1) H1(3) M3 (1)	N = 29
	H2: 490-499 (3)	H1 (6)	
	H1: 480-489 (9)	H2 (1) M6(4)	
	M6: 470-479 (4)	M5 (2) M4 (2) M3 (1)	
	M5: 460-469 (3)	M5 (1) M4 (1) M3 (3) M1 (1) L4 (1)	
M	M4: 450-459 (5)	M4 (2) M3 (3) M2 (3)	M
B1 (420-479)	M3: 440-449 (10)	M3 (1) M2 (1) M1 (3) L4 (1)	B1 (420-479)
N = 30	M2: 430-439 (4)	M3 (1) L3 (9) L2 (1)	N = 45
	M1: 420-429 (4)	L4 (5) L3 (3)	
	L4: 410-419 (19)	L4 (2) L4-(1) L3 (2) L2 (2)	
L	L3: 400-409 (7)	L3 (1) L2 (2)	L
A2 (380-419)	L2: 390-399 (4)		A2 (380-419)
N = 30	L1: 380-389		N = 10

Figure 4.5 shows that the means of posttest scores are higher than those of pretest scores of all three groups. It is likely that HybridNTELL model did not frustrate learners in any group. However, the difference between the pre-and posttest cannot ensure that the HybridNTELL environment benefited the students in general regardless of their previous levels of English proficiency. Repeated-measures ANOVAs were used to investigate if the improvement was dependent upon their proficiency levels or their learning with HybridNTELL model. Results indicated no significant interaction between the students' pretest scores and the degree to which their English proficiency improved, $F(2, 87) = .248$, $p = 781$. However, there is a significant interaction between their performance scores in learning with HybridNTELL model, $F(6, 87) = 7.04$, $p < .01$.

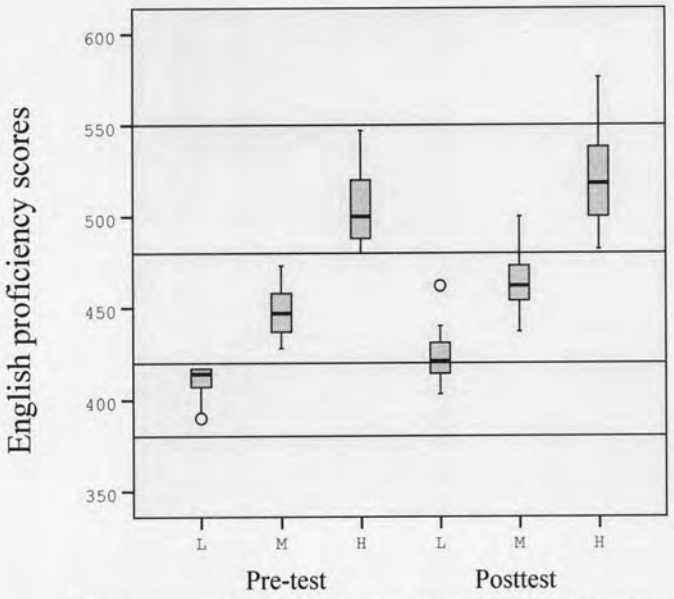


Figure 4.5 Improvement of English proficiency scores between three proficiency groups

4.2.4.2 Curriculum-based achievement

Achievement of the students in the treatment group was examined by comparing their curriculum-based final test scores with the scores of the population. At the beginning of the course, the group of the students were drawn from the population with the mean score of their English proficiency ($M = 454.18$, $SD = 41.66$) showing no significant difference comparing to the mean score of the population ($M = 454.03$, $SD = 42.94$), $t = .185$, $p = .854$. After the treatment over a semester, the treatment group had higher final scores ($M = 32.24$, $SD = 4.40$) than did the population ($M = 28.35$, $SD = 6.09$), $t = 6.66$, $p < .001$). The standard deviation also exhibits a less variety within the experiment group as related to the population group.

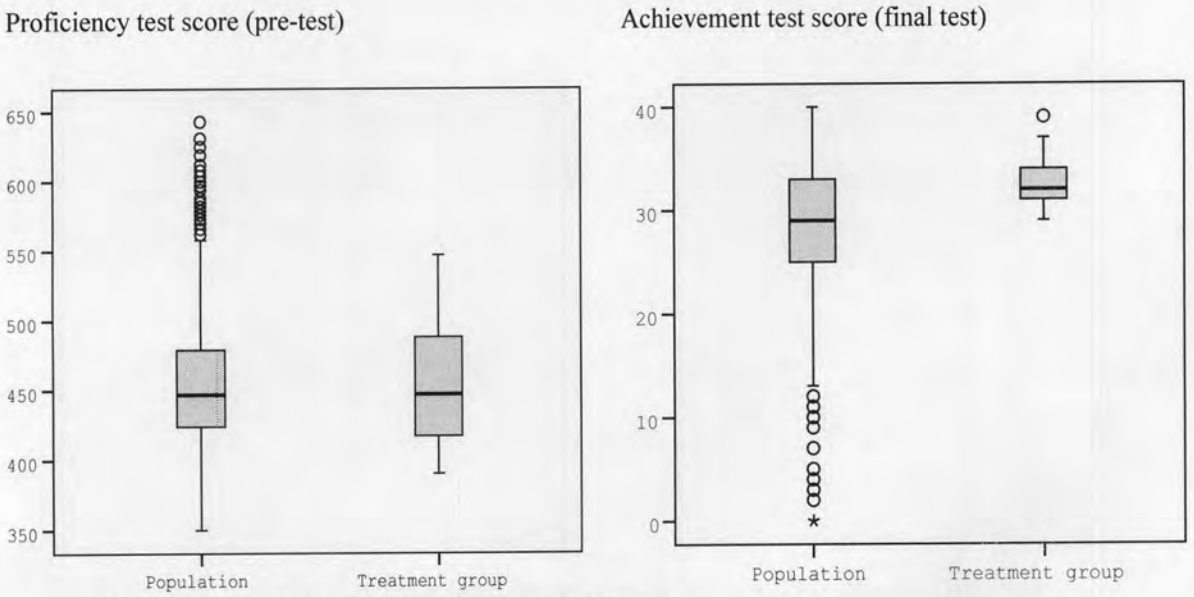


Figure 4.6 The students' curriculum-based achievement

Figure 4.6 shows the change over time of the population and the treatment group. The majority of the population showed good performance in the achievement test. However, the treatment group made better progress.

It is interesting to investigate the factors leading to higher scores the students gained on the achievement test. Further observations on the students' achievement (see 4.3) provide interesting explanations to the phenomenon.

4.2.4.3 Holistic analysis of autonomy development through task performance

The interaction effect between the students' degree of autonomy demonstrated in task performance and their previous English proficiency level encouraged an investigation into the students' autonomy development through different task type performance. Holistic scales for task assessment based on curriculum and literature were used to measure the students' degree of autonomy demonstrated. Inter-rater reliability was analyzed to yield integrity in the scores used in the examination. The researcher sought to investigate different aspects of development. First, the general autonomy development of the students' with different English proficiency was investigated. Then, the students' autonomy development based on their previous English proficiency level and their degree of improvement calculated in *z* score was analyzed.

Table 4.5 and Figure 4.7 presents the students' development of autonomy in the four task types in three task cycles (see Figure 3.11). The mean scores from the students' task performance were used to show the development overtime and between groups. The development overtime suggests that the students made progress in their development. The students' previous English proficiency level appeared to have less effect on the students' development in the Re-inter task type while the other three task types did. In Re-inde and Pro-inter task types, the students with moderate English proficiency level demonstrated a development of autonomy towards the degrees closer to those the students in high proficiency group demonstrated. However, in Pro-inde task type, the moderate proficiency group showed a lower degree of autonomy than the high proficiency group and closer to the low proficiency group.

Table 4.5
The students' development of autonomy in the four task types

Reactive-interdependent tasks

	Task cycles			
	1	2	3	Dev
H	71.07	82.52	91.97	20.9
M	70.73	76.02	88.00	17.27
L	69.5	77.39	87.46	17.97

Reactive-independent tasks

	Task cycles			
	1	2	3	Dev
H	60.28	73.89	84.14	23.86
M	50.95	68.29	82.11	31.16
L	44.95	58.29	74.93	29.98

Proactive-interdependent tasks

	Task cycles			
	1	2	3	Dev
H	56.76	75.46	81.84	25.08
M	50.77	71.86	81.59	30.82
L	47.24	59.71	75.50	28.26

Proactive-independent tasks

	Task cycles			
	1	2	3	Dev
H	42.83	66.70	81.89	39.06
M	40.86	59.49	74.54	33.68
L	37.71	56.28	72.63	34.92

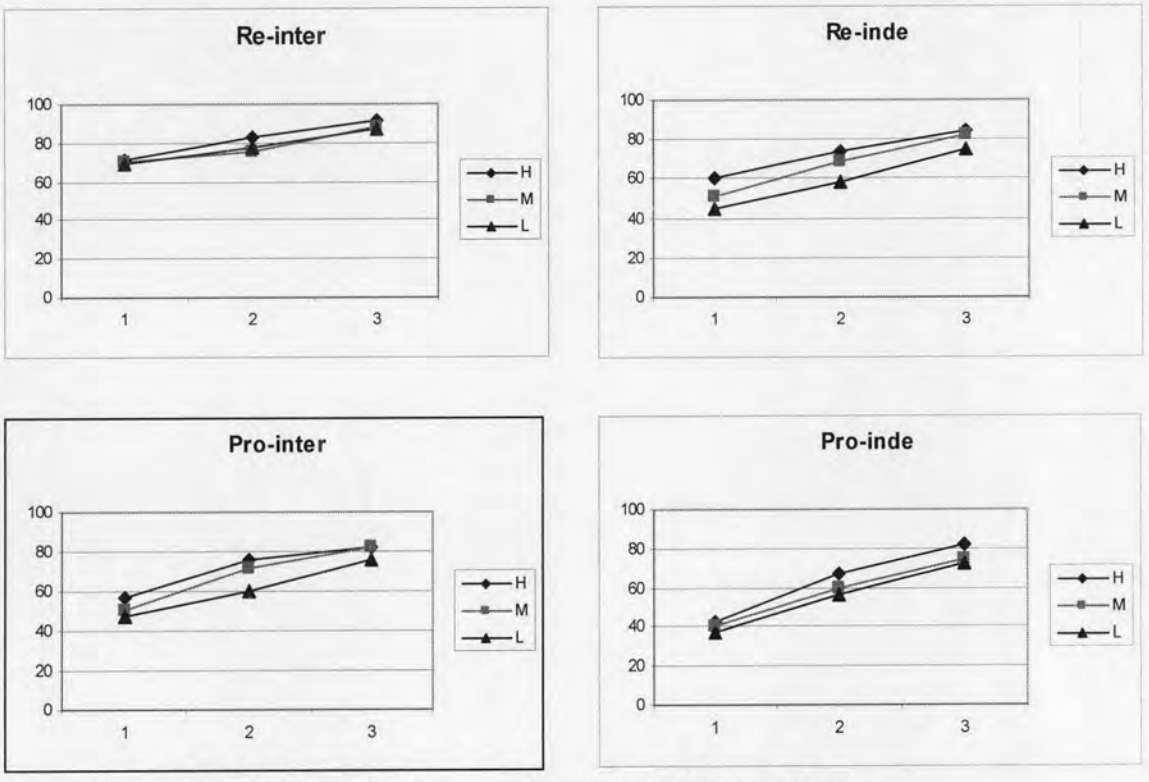


Figure 4.7 The students' development of autonomy in the four task types

Since task types appeared to have an interaction effect with the students' proficiency levels on their performance, it is important to examine how students' with different degrees of improvement in English proficiency developed through the tasks. The degrees of students' improvement in English proficiency were measured based on the *z* score and standard deviation of their difference between the pre-and posttest were used to categorize the students into the high achievers ($z > .50$), the moderate achievers ($z = -.49 > .49$), and the low achievers ($z < -.50$).

Table 4.6 and Figure 4.8 present the high proficiency groups categorized into three levels: high proficiency group with high achievement (H-H), high proficiency group with moderate achievement (H-M), and high proficiency group with low achievement (H-L).

Table 4.6
The autonomy development of high proficiency groups in four task types

Reactive-interdependent tasks

	Task cycles			
	1	2	3	Dev
H	71.07	82.52	91.97	20.9
M	70.73	76.02	88.00	17.27
L	69.5	77.39	87.46	17.97

Reactive-independent tasks

	Task cycles			
	1	2	3	Dev
H	60.28	73.89	84.14	23.86
M	50.95	68.29	82.11	31.16
L	44.95	58.29	74.93	29.98

Proactive-interdependent tasks

	Task cycles			
	1	2	3	Dev
H	56.76	75.46	81.84	25.08
M	50.77	71.86	81.59	30.82
L	47.24	59.71	75.50	28.26

Proactive-independent tasks

	Task cycles			
	1	2	3	Dev
H	42.83	66.70	81.89	39.06
M	40.86	59.49	74.54	33.68
L	37.71	56.28	72.63	34.92

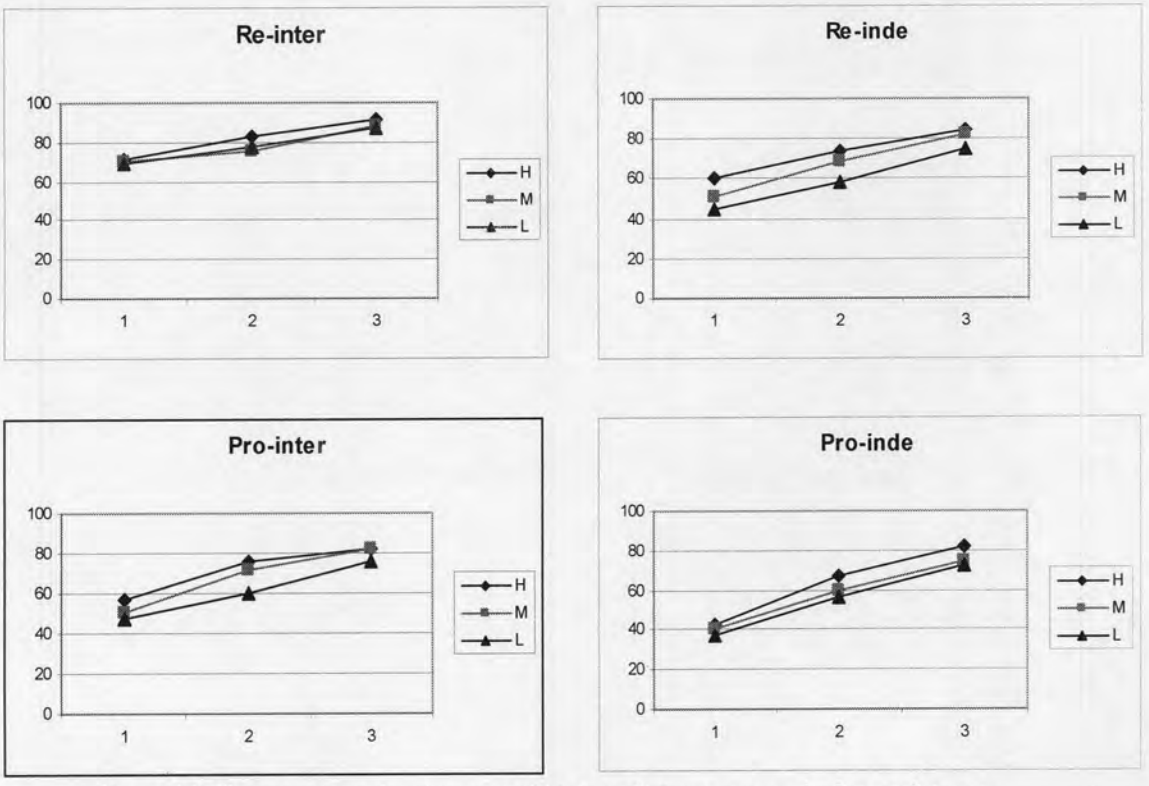


Figure 4.8 The autonomy development of high proficiency groups in four task types

Table 4.7 and Figure 4.9 present the moderate proficiency groups categorized into three levels: moderate proficiency group with high achievement (H-H), moderate

proficiency group with moderate achievement (H-M), and moderate proficiency group with low achievement (H-L).

Table 4.7
The autonomy development of moderate proficiency groups in four task types

Reactive-interdependent tasks

	Task cycles			
	1	2	3	Dev
H	71.91	84.35	98.25	26.34
M	69.87	72.24	87.64	17.77
L	70.42	71.48	78.12	7.70

Reactive-independent tasks

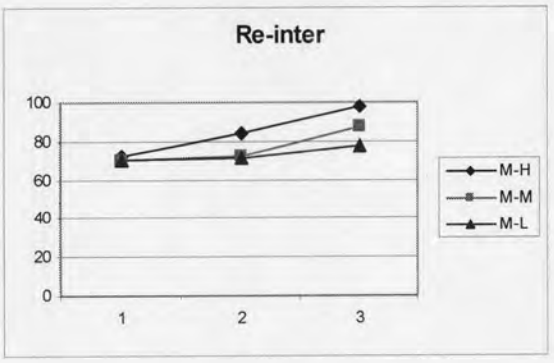
	Task cycles			
	1	2	3	Dev
H	56.43	78.29	95.73	39.30
M	48.63	69.32	81.86	33.23
L	47.78	57.25	68.74	20.96

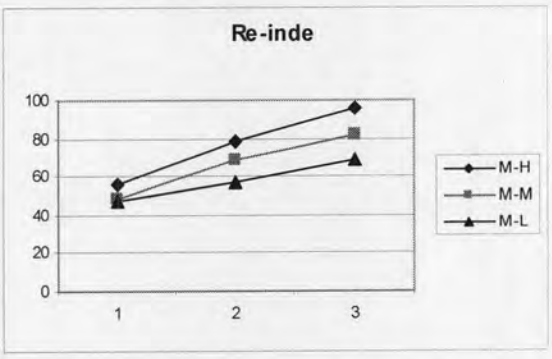
Proactive-interdependent tasks

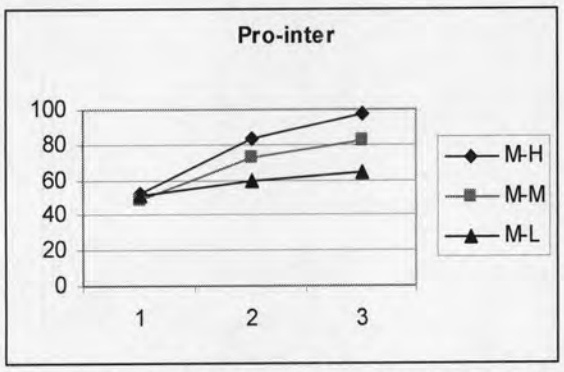
	Task cycles			
	1	2	3	Dev
H	52.82	83.46	98.12	45.30
M	48.83	73.19	82.18	33.35
L	50.67	58.93	64.48	13.81

Proactive-independent tasks

	Task cycles			
	1	2	3	Dev
H	45.25	70.21	87.35	42.10
M	38.92	61.47	73.56	34.64
L	38.41	46.78	62.71	24.30







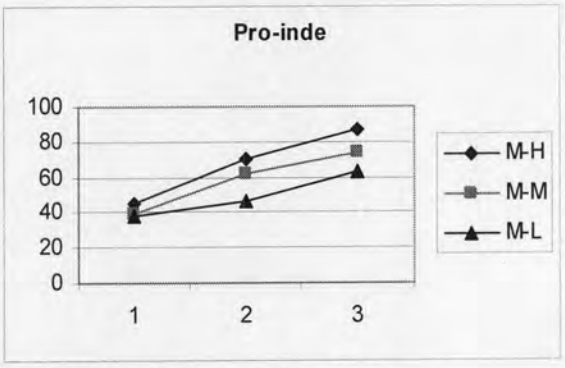


Figure 4.9 The autonomy development of moderate proficiency groups in four task types

Table 4.8 and Figure 4.10 present the low proficiency groups categorized into three levels: low proficiency group with high achievement (H-H), low proficiency group with moderate achievement (H-M), and low proficiency group with low achievement (H-L).

Table 4.8 The autonomy development of low proficiency groups in four task types

Reactive-interdependent tasks

	Task cycles			
	1	2	3	Dev
H	71.41	86.25	94.73	23.32
M	69.67	75.44	89.24	19.57
L	67.41	70.48	78.42	11.01

Reactive-independent tasks

	Task cycles			
	1	2	3	Dev
H	46.43	68.29	87.72	41.29
M	45.63	59.32	78.32	32.69
L	42.78	47.25	58.74	15.96

Proactive-interdependent tasks

	Task cycles			
	1	2	3	Dev
H	48.22	72.41	85.42	37.20
M	48.83	58.29	78.58	29.75
L	44.67	48.43	62.49	17.82

Proactive-independent tasks

	Task cycles			
	1	2	3	Dev
H	41.21	67.24	85.52	44.31
M	36.22	59.42	74.26	38.04
L	35.71	42.18	58.11	22.40

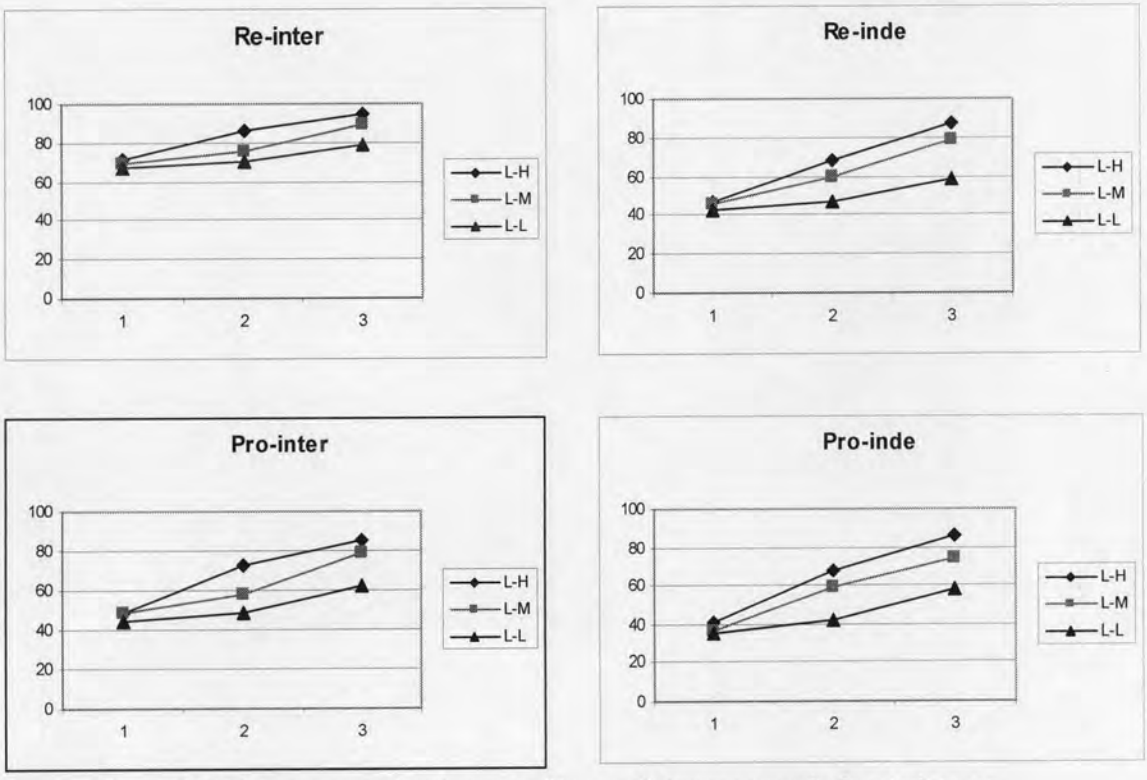


Figure 4.10 The autonomy development of low proficiency groups in four task types

4.2.4.4 Objective analysis of language development in task performance

Being aware of a large corpus of students' production for language analysis, the researcher needs to carefully select the portion of data that represent the students' language development overtime based on social constructivist theory. Three task cycles of the Pro-inter task type were selected since the task involved the students' development through collective scaffolding which relates directly to the concept of the Zone of Proximal Development addressed by Vygotsky. In his explanation, an

investigation into the learners' development should focus on what they can do by themselves which constitutes their actual development level and what they can do by the help of others which constitutes their potential development level.

By its nature, the Pro-inter task type can serve to investigate further how the students develop their language skills over time. 27 participants: nine from the high proficiency group, nine from the moderate proficiency group, and nine from the low proficiency group. In each proficiency group, the students z score was used to calculate their improvement of English proficiency and categorize them into the high achievers ($z > .50$), the moderate achievers ($z = -.49 > .49$), and the low achievers ($z < -.50$). In each proficiency group, three high achievers, three moderate achievers and three low achievers were randomly selected for this investigation of students' language development.

The HybridNTELL model incorporates three selected developmental measures in three aspects of development: fluency, accuracy and complexity based on the developmental index proposed by Wolfe-Quintero, Inagaki and Kim (1998). The measures include (1) the total number of word count for fluency development, (2) the ratio of error-free T-units per total number of T-units for accuracy development, and (3) the ratio of total number of clauses per T-units for complexity. The underlying assumption is that these three characteristics of language development progress in tandem, that more proficient second language writer write more fluently, accurately, and grammatically and lexically complex sentences than less proficient writers.

Apart from the three aspects of development, the students' development in use of language focus was also evaluated to see their growth overtime through social interaction. The language focus in the experiment was the use of comparison and contrast features. The assessment was based on both language form and meaning aspects.

This section summarizes the results of the selected 27 participants' language development in four aspects based on HybridNTELL model measurement: (a) fluency, (b) accuracy, (c) complexity, and (d) focus language features.

a) Fluency

Figure 4.11 shows that the higher achievers tend to produce more words than the low achievers with all levels of English proficiency. The high achievers with high and moderate English proficiency seem to trade off their fluency with accuracy or complexity in their second drafts. On the contrary, the high achievers with low

English proficiency developed their fluency more extensively than the high achievers with high and moderate English proficiency. The moderate and the low achievers with high and moderate English proficiency tend to show a similar pattern of development to those with low English proficiency in that they did not trade off their fluency in their second drafts. They produced the same or more number of words in their second drafts but their fluency dropped when producing the next new piece of writing. The low achievers with low English proficiency seem to trade off their fluency at the beginning but they changed to the same pattern as those low achievers with high and moderate English proficiency.

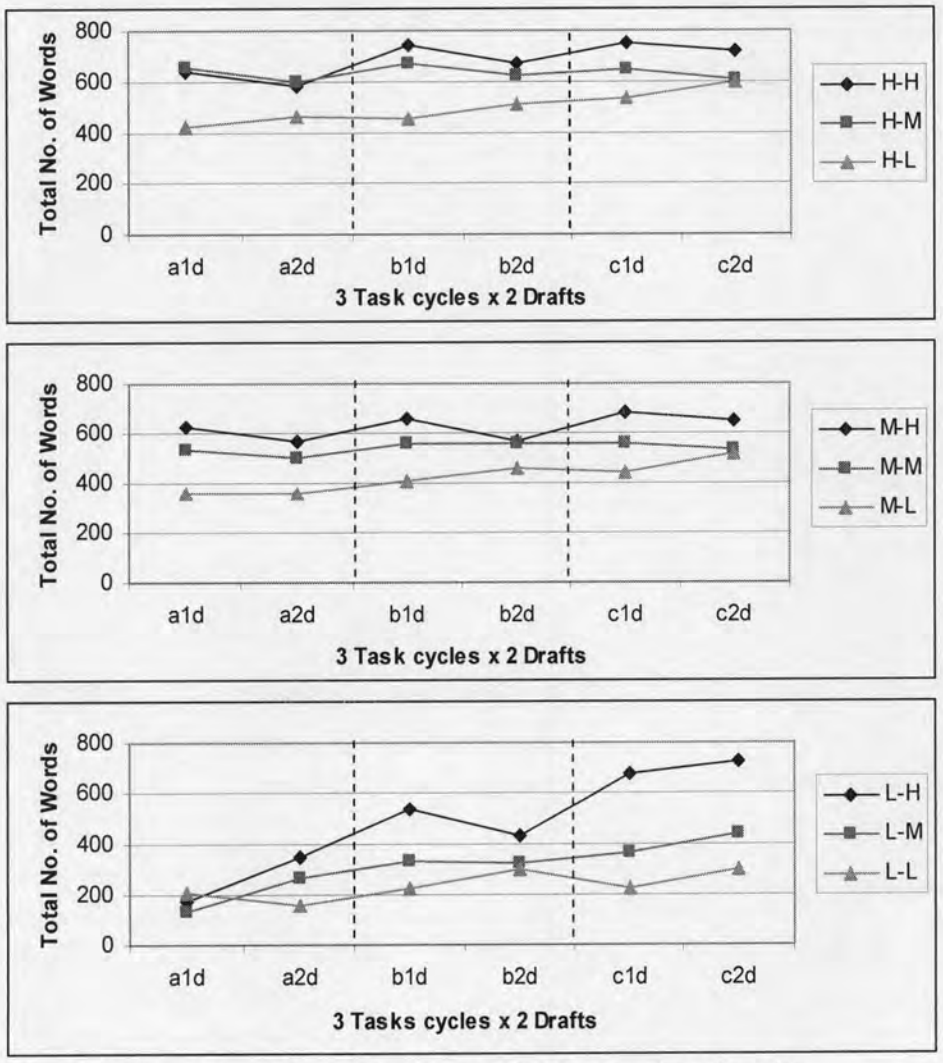


Figure 4.11 The students' fluency development (the total number of words)
Note: a1d = 1st draft of the first piece of writing; a2d = 2nd draft of the first piece of writing; b1d = 1st draft of the second piece of writing; b2d = 2nd draft of the second piece of writing; c3d = 1st draft of the third piece of writing; and c2d = 2nd draft of the third piece of writing

Although we can see some patterns of students with different degrees of achievement and English proficiency levels, only fluency cannot predict much about their potential development.

b) Accuracy

With the nature of the Pro-inter task type that allows collective scaffolding, the students with all levels of achievement and English proficiency appear to show accuracy development. It is assumed that the difference between the students' first drafts and second drafts show their ZPD where the first draft reflected their actual level of development and the second draft reflected their potential level of development. Only one cycle of task is not sufficient to examine their zone. For this reason, in HybridNTELL model, there are three cycles of the same task type to let us see more clearly how the students developed. The plot linking the students' first drafts in all task cycles reveals that those high achievers are the ones who did not merely show the development between firsts and second drafts but between the first drafts along the task cycles (see Figure 4.12). Furthermore, their second drafts reflect more accuracy than those of students with low or moderate levels of achievement.

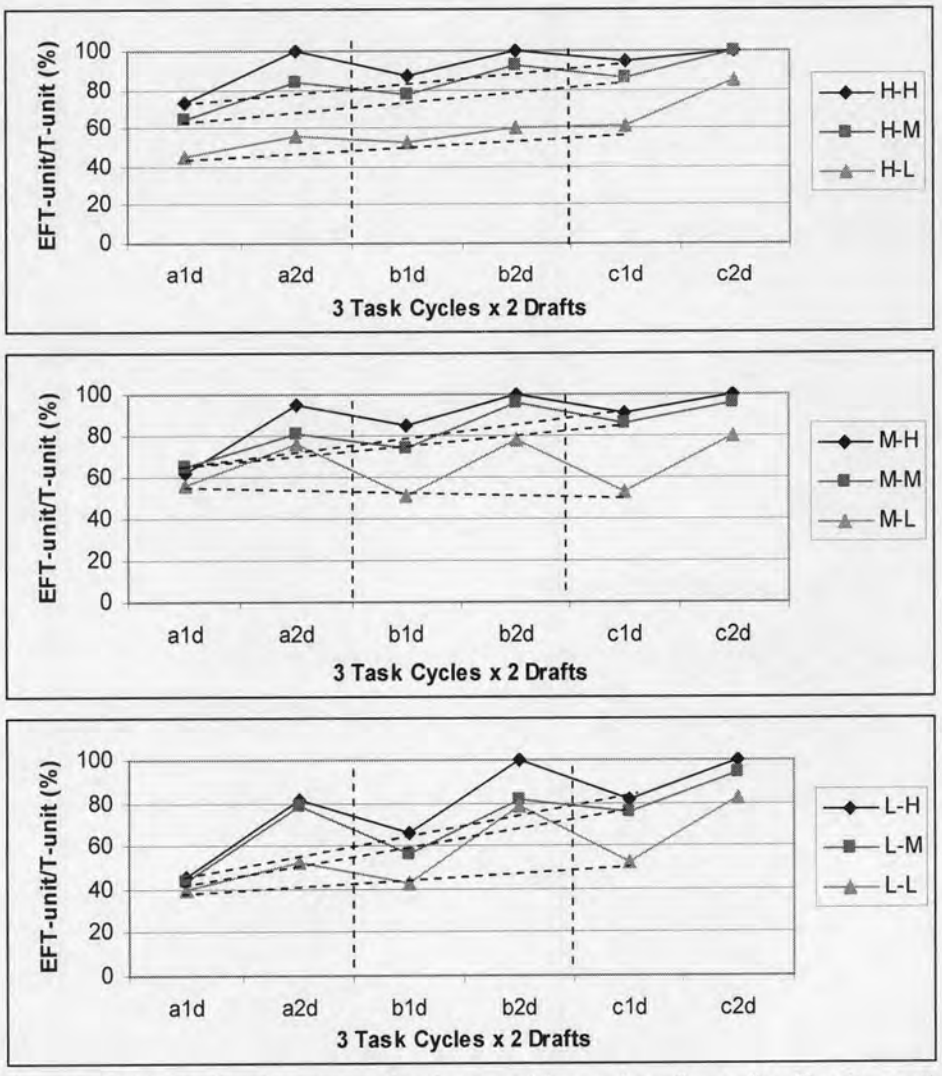
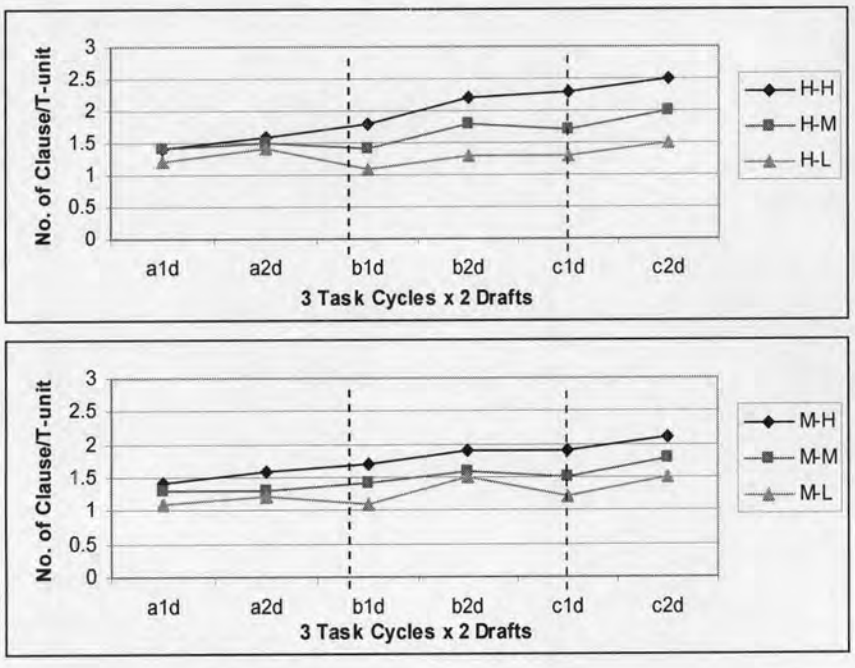


Figure 4.12 The students' accuracy development (the number of error free T-units per the total number of T-units)

The relationship between the results from the measures of accuracy and fluency give a clearer view of the students' developmental patterns. The high achievers tend to develop both fluency in their first drafts and accuracy in their second drafts. The lower achievers, although show development in fluency, developed their accuracy in lesser degrees.

c) Complexity

The last aspect of the students' developmental index is the measure of complexity in their language use. Although complexity was not evaluated in their performance, it directly relates to curriculum-based language focus. The students were to write comparison and contrast essay which involves a variety of complex sentence structures. Figure 4.13 shows that the high achievers with high levels of English proficiency tried to develop farther in complexity aspect than the other high achievers with low and moderate levels of English proficiency. An increase in complexity of the higher achievers with high and moderate English proficiency levels did not seem to be influenced by collective scaffolding. Their development pattern show a constant increase in complexity from the first draft of task cycle one to the second draft of task cycle three. On the other hand, the high achievers with low English proficiency and the low and moderate achievers with all levels of English proficiency appear to develop their complexity of language use after one task cycle.



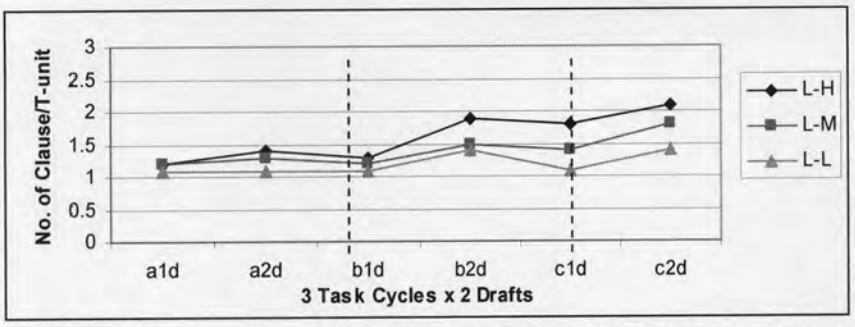
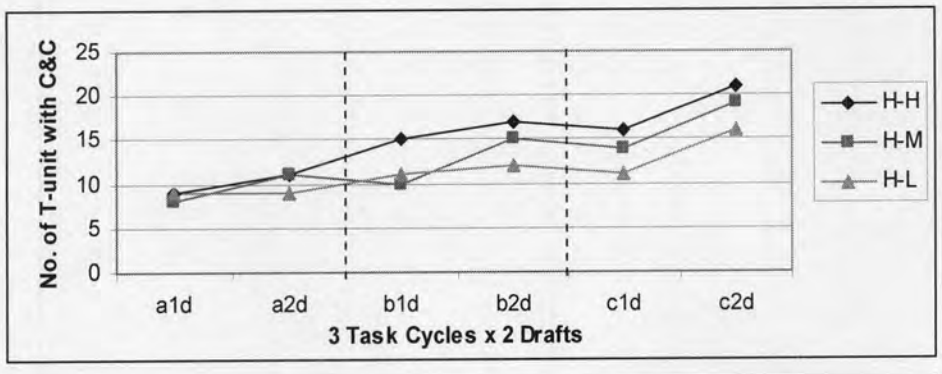
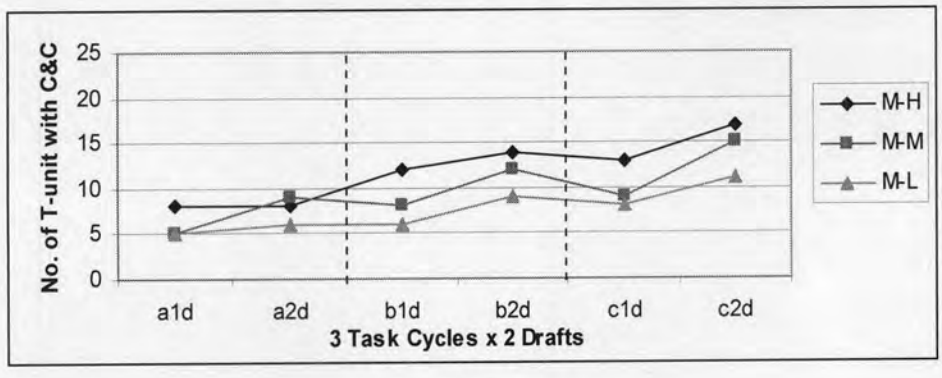


Figure 4.13 The students' complexity development (total number of clauses per T-units)
Note: a1d = 1st draft of the first piece of writing; a2d = 2nd draft of the first piece of writing; b1d = 1st draft of the second piece of writing; b2d = 2nd draft of the second piece of writing; c3d = 1st draft of the third piece of writing; and c2d = 2nd draft of the third piece of writing

d) Comparison and contrast features

The complexity of language use partly link to how well and to what extent the students show comparison and contrast in their writing. The of students' presentation of comparison and contrast was investigated from the number of T-units containing the unit of idea showing comparison and contrast. Figure 4.14 describes the students development in their presentation of comparison and contrast through their writing. All students show development in number of comparison and contrast ideas presented. However, the high achievers show the higher extensive range of development than the other level of achievers.





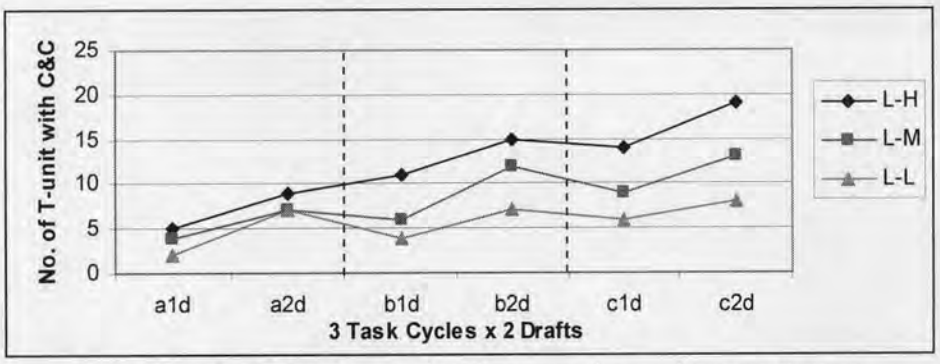


Figure 4.14 The students' development in using comparison and contrast features
Note: a1d = 1st draft of the first piece of writing; a2d = 2nd draft of the first piece of writing; b1d = 1st draft of the second piece of writing; b2d = 2nd draft of the second piece of writing; c3d = 1st draft of the third piece of writing; and c2d = 2nd draft of the third piece of writing

The above analysis of the student's language development revealed that the high achievers show a greater zone of proximal development than the other levels of achievers in all aspects of language development. As well, the results confirm that the previous English proficiency level is not the main effect of the students' improvement and achievement in their English language learning.

4.3 Further observation on students' performance

Since the students' development involves various unexpected factors, the researcher attempted to search for related variables in the HybridNTELL model to be investigated. The further observation on students' performance was conducted thank to the online database recording all online interaction. The database contains valuable resources for observation on how students learned and developed from social constructivist perspective. In this section, such interesting variables as students' participation, patterns of interaction, rate of interaction, discourse types, and degrees of assistance required were investigated.

4.3.1 The students' participation

From classroom records, all students (N = 143) participated in class activities for more than 80% of class hours (M = 90.2, SD = 5.45). Online participation was investigated through the past logs. The system created a record out of each interaction a student made in the online environment. The students' record over the course of a semester (16 weeks) showed a wide range of interaction frequency (Record M = 1495.80, SD = 268.45), access frequency (Day M = 5.8, SD = 2.13) and behaviors (Viewing M = 1109.70, SD = 211.34; initiating M = 76.56, SD = 17.22; responding M = 208.89, SD = 45.44; editing M = 365.44, SD = 54.76; and deleting M = 314.21, SD

= 48.87). The results offered both pedagogical and technical cautions. From a pedagogical view point, we need to make sure that each interaction resulted in learning facilitation rather than frustration. From a technical view point, the HybridNTELL tools served heavy functions and required sufficient resource capacity to maintain.

HybridNTELL environment aimed to enhance the rate of interactions between the students based on the belief that more interactions provide more chance of emergent learning. In a large EFL class with approximately 40-60 students, one-on-one interactions between students and teacher is not practical from management view point. From the modern pedagogical view point, too much dependent on teachers will obstruct students' growth to be autonomous language learners and users. Figure 4.15 provides an overview of HybridNTELL classroom and online settings which as mentioned above mirror and complement each other to serve for both large class management and good learning outcome. G1-G10 represents Group 1 to 10. Group one is a magnified interaction patterns among students in group which is found similar in other groups. The arrows suggest some example of interactions that can occur between the interlocutors.

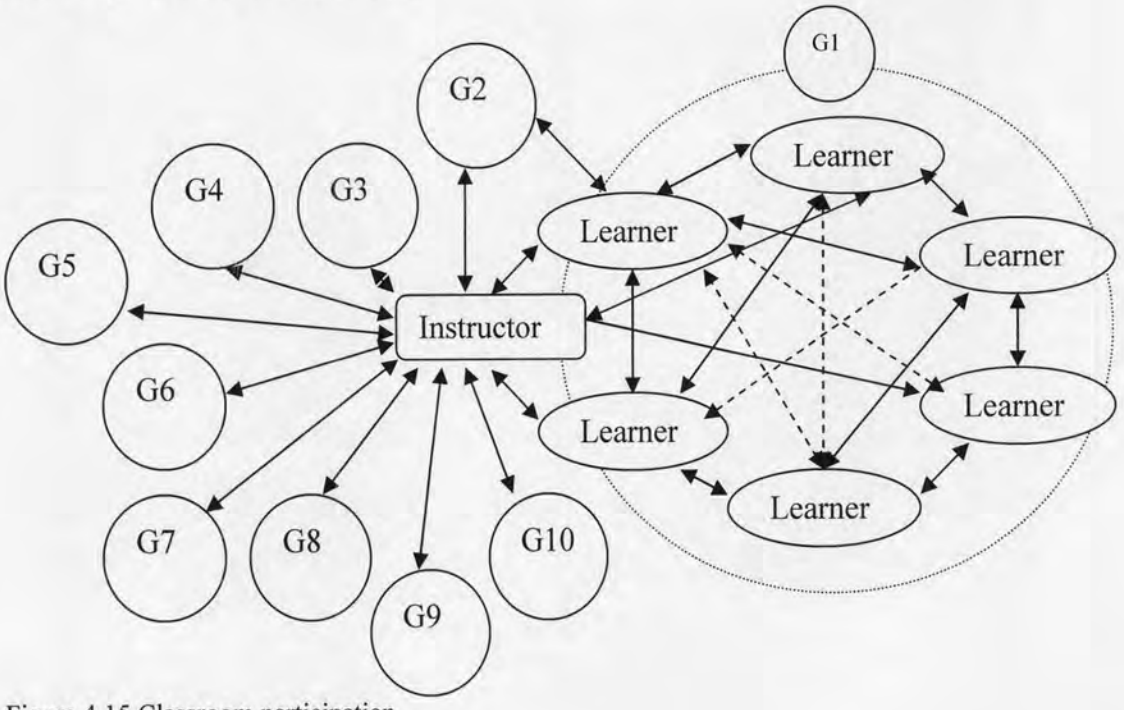


Figure 4.15 Classroom participation

4.3.2 Students' interaction patterns

To keep balance between having mixed ability group and learners' opportunity to form a group with shared interests, a stratified random assignment technique is used (see Chapter III). Each group is assumed to have equivalent basic competency to the others comprising of members with good and limited English proficiency, computer literacy, and ones in the middle.

Storch's (2002) model (Figure 4.16, see Chapter II for explanation) of dyadic interaction was adopted to analyze interaction patterns found in HybridNTELL environment. The 143 students in three classes: 50 social science students (class A); 47 biological science students (class B); and 46 technological science students (class C) were examined in groups to find out their interaction patterns. The results indicated some deviation from Storch's model. No group with dominant/dominant participation was found; however, three groups with collaborative with one absent participation were observed. Furthermore, students were assumed their roles as good/limited English proficiency and good/limited computer literacy in HybridNTELL model, it is necessary to expand the expert/novice and dominant/passive types to examine the expert and dominant roles. In some groups, experts or dominants were presumed as good in either English proficiency or computer literacy; however, some have those who were presumed as limited or moderate in both skills taken the expert or dominant roles.

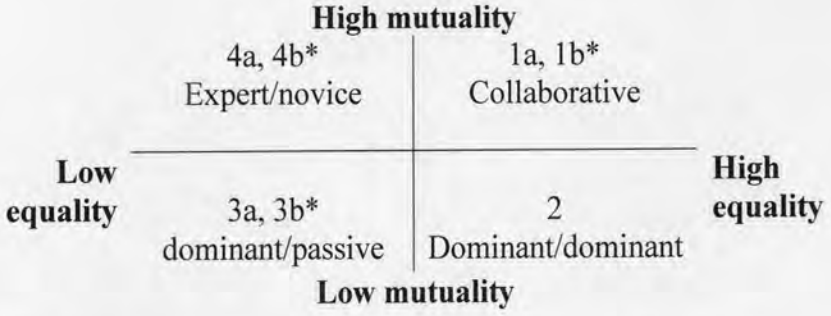


Figure 4.16 HybridNTELL model interaction patterns (adapted from Storch, 2002: 128)
Note: 1b* = collaborative with one absent
3b* = dominant participants with limited/moderate skills in English/computer
4b* = expert participants with limited/moderate skills in English/computer

Table 4.9 described the interaction patterns found in HybridNTELL model. The students in HybridNTELL model were observed during the three task cycles (see Chapter III). There were 28 groups of students in total. Three sets of four task types were administered in repetition producing three task cycles. Overtime, some groups have restructured their patterns of interaction to accommodate their group members, improve learning outcomes, or keep balance after some members' change their behavior. In defining group types in their dynamic fashion, the decision was based on the observation from at least two task cycles. For example, if a group has changed after task cycle 1, then their pattern found in task cycle 2 and 3 was determined as their group type. Similarly, if a group changed after task cycle 2, then their pattern found in task cycle 1 and 2 was determined as their group type. Most of the observation was based on Pro-inter tasks due to the nature of the task that allows observation during both class conference and online conference. However, the results showed that group interaction patterns observed from only Pro-inter tasks influence the students' performance in other task types. Furthermore, their interaction patterns were found identical on both classroom conference and online conference platforms. Thus, there is no need to describe their interaction patterns separately in each platform; instead a holistic view of observation covered the judgment on both platforms of interaction are described. The instruments used to examine group types were teacher's observation recorded during class conference, teacher's observation on the online system logs, and the students' *Assessment of Contributions of Group Members* (Fink, 2004).

Table 4.9
Students' dynamic interaction patterns in HybridNTELL model

Interaction types	Task cycles 1	2	3	Group types determined	N= 28
Collaborative (1a)	A3 A4 B1 B7 B8 C5 C8	A3 A4 B1 B7 B8 C5 C8 A1 A8 A9 C2 C3 C7	A3 A4 B1 B7 B8 C5 C8 A1 A8 A9 C2 C3 C7	A3 A4 B1 B7 B8 C5 C8 A1 A8 A9 C2 C3 C7	N= 13
Collaborative with one absent (1b)	A6 A7	A6 A7 C6	A6 A7 C6	A6 A7 C6	N= 3
Dominant/ passive (3a)	A2 B6 B9 C3	A2 B6 B9	B9	A2 B6 B9	N= 3
Dominant/ passive (3b)	A5 A10 B5 C6	A10 B5 x x	A10 B5 x x	A10 B5 x x	N= 2
Expert/novice (4a)	A1 A8 B2 B3 B4 C1 C2 C4 C7 x x x x	x x B2 B3 B4 C1 x C4 x x A5 A9 x	x x B2 B3 B4 C1 x C4 x A2 A5 A9 B6	x x B2 B3 B4 C1 x C4 x x A5 A9 x	N= 7
Expert/novice (4b)	A5 A9	x x	x x	x x	N= 0

Note: N = Number of groups
the role of expert or novice is based on their actual role in the learning whether they act as a leader or a follower in discussions; the roles are not judged from their previous English proficiency scores or computer literacy.

4.3.3 The students' achievement based on their pattern of interactions

Table 4.10 shows that the majority of students in group 1a, 1b and 4a gained more than 25 points. Some students in group b1 and 3a gained lower scores than 20 while no students from the other groups gained this low score. It is interesting to note that students in group 3a with more proficient dominants are assumed to make higher

achievement than those in 3b with less proficient dominants but the results show otherwise. More students in group 3b made higher achievement than those in group 3a. Based on the achievement scores, groups' interaction patterns are likely to have an effect on students' achievement.

Table 4.10
The students' achievement after learning with HybridNTELL environment

Achievement scores	Groups' interaction patterns (n = 143)				
	1a (n=68)	1b (n=15)	3a (n=15)	3b (n=10)	4a (n=35)
36-40 (n = 22)	12	3	1	2	4
31-35 (n = 60)	37	8	-	3	12
26-30 (n = 33)	13	2	5	1	12
21-25 (n = 24)	6	-	7	4	7
16-20 (n = 3)	-	1	2	-	-
11-15 (n = 1)	-	1	-	-	-

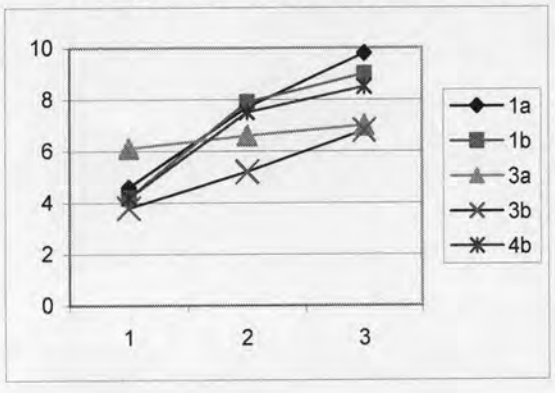
Note n = number of students

This investigation provided a basis on which further investigation on students' task performance in groups was conducted.

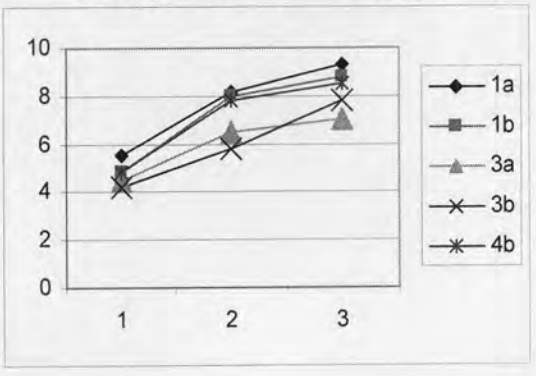
4.3.4 Interaction patterns and students' performance in HybridNTELL environment

Based on social constructivist approach to investigating students' performance in social interaction, the students' performance in each of the four task types in HybridNTELL environment were observed in groups. The groups' mean scores were calculated and analyzed together with the other groups in the same interaction patterns. Figure 4.17 displays the development in performance of students' in groups of the five interaction patterns observed from all four task types.

Task type 1: reactive-interdependent tasks



Task type 2: reactive-independent tasks



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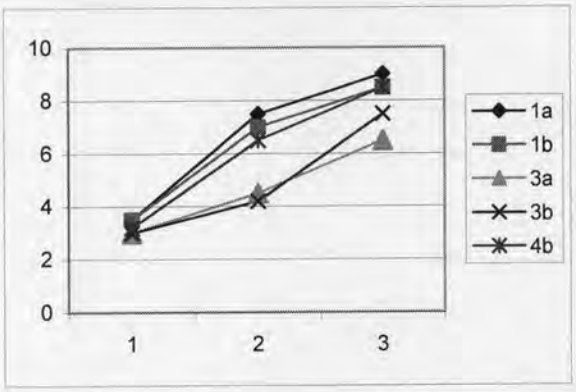
Task type 3: proactive-interdependent tasks



Task type 4: proactive-independent tasks

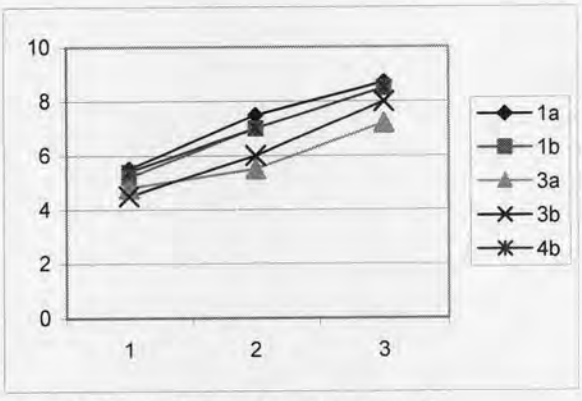


Figure 4.17 The development in performance of the students' in four task types based on group's patterns of interaction

The results from Figure 4.17 indicated that the groups with collaborative interaction pattern (1a), those with expert/novice interaction patterns (3a), and those collaborative with one absent pattern (1b) demonstrated higher performance than those with dominant/passive (4a, 4b) interaction patterns observed mainly from the Pro-inter task type. This task type requires active participation from all members. Each member plays an important role in sharing their goal-directed products with other members in the group. Then, everybody in the whole group shared their efforts to accomplish the team goal. The students take the control in directing their goal, process, evaluation as well as appealing for assistance. However, the interaction patterns observed do not only influence the students' performance in Pro-inter task type but also the other task types in different degrees. The followings are a closer investigation of the students' performance based on the results in each task type.

To show a clearer picture of the differences between groups, mean scores and standard deviation were discussed. As well, the average performance and range of development support the evidence of growth.

Task type 1: reactive-interdependent (Re-inter). The students in every group showed improvement in Re-inter task performance (see Table 4.11 and Figure 4.18). It is interesting to note that group 3a started higher than the other groups ($M = 6.1$, $SD = 1.1$) but had the lowest range of development (Dev = 1.4). Three groups: 1a, 1b and 4a made similar range of progress (Dev = 4.9, 4.5 and 4.3 respectively) and group 1a appears to do better than the other two groups. They reached the highest level ($M = 9.5$, $SD = 1.3$) in task cycle 3 as well as show smaller range of scores, that is, the students regardless of their levels of proficiency achieved at similar levels.

Cooperation in groups appears to give equal opportunities for the students to develop their skills. In contrast, group 3a and 3b shows more diversity in development. It is likely that a lack of cooperation among all members make some groups lag behind in development. Group 3a with presumed experts might not have the real capable person to take the lead in this type of performance. An assumption possibly made here is that cooperation among all members has more influence to the groups' progress than having a member with presumed high English proficiency or good computer literacy. The evidence in the progress of group 3a, at the similar level as 3b, the groups with presumed dominant novices, supports this claim. Although lacking experts taking the leader role, 3b groups made progress even further than group 3a in the last cycle of Re-inter task ($M = 7.7$, $SD = 2.0$, Dev = 3.7). Their average performance appears lower only due to the fact that they started at a lower level.

Table 4.11
Re-inter task type: Mean scores and standard deviation showing the performance and development of the five groups

Group types	Task cycles						Total		Dev
	1		2		3				
	M	SD	M	SD	M	SD	M	SD	
1a (n=13)	4.6	2.3	7.7	1.8	9.5	1.3	7.3	1.8	4.9
1b (n= 3)	4.5	1.2	7.9	0.6	9.0	0.6	7.1	0.8	4.5
3a (n= 3)	6.1	1.1	7.0	1.8	7.5	1.9	6.9	1.6	1.4
3b (n= 2)	3.8	0.8	5.2	2.2	7.7	2.0	5.7	1.7	3.7
4a (n= 7)	4.2	1.7	7.5	1.2	8.5	1.6	6.7	1.5	4.3

Note: Mean scores were based on the score from each task (=10)
Group type: 1a = collaborative, 1b = collaborative with one absent, 3a = dominant expert/passive novice, 3b = dominant novice/passive expert, 4b = active expert/novice

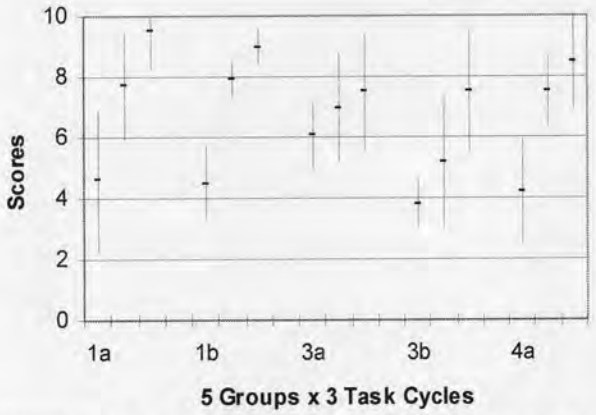


Figure 4.18 Re-inter: Illustration of Mean scores and standard deviation showing the performance and development of the five groups

The standard deviation suggested that group 1a and 4a showed a wide range of scores ($SD = 2.3$ and 1.7 respectively) with the lowest scores lower than the other groups at the beginning. The spread of score range in pattern 1a and 4b is partly due

to the more number of groups (n = 13, n = 7) than those in the other patterns. In addition, chances are that some groups might find it difficult to reach an agreement in completing the task while some did not have this problem. Those groups then made the lowest score at the beginning. I unofficially interviewed some groups in pattern 1a and 4b and found that they actively shared ideas and contributed to the task so they came up with too many ideas to manage to complete the task in time. When they adjusted their group management, they made better progress in task cycle 2 and 3 than the other groups.

Task type 2: reactive-independent (Re-inde). All students made progress in Re-inde task type along the three task cycles. The pattern of development appears similar to that in Re-inter task type. The three groups: 1a, 1b, and 4b made better progress than group 3a and 3b. Furthermore, the interesting observation in Re-inde tasks is that group 3b made a better progress (M = 7.8, SD =1.4) than group 3a (M = 6.7, SD = 2.5) based on the mean scores from the last task cycle. However, group 3a shows a more diversity in development. It is likely that the dominant experts in group made good progress while the passive novices were left behind.

Table 4.12
Re-inde task type: Mean scores and standard deviation showing the performance and development of the five groups

Group types	Task cycles						Total		Dev
	1		2		3				
	M	SD	M	SD	M	SD	M	SD	
1a (n=13)	6.5	1.5	8.2	1.8	9.3	0.8	8.0	1.4	2.8
1b (n= 3)	4.8	2.9	8.0	3.2	8.8	1.2	7.2	2.4	4.0
3a (n= 3)	4.5	3.4	6.5	3.5	6.7	2.5	6.0	3.1	2.5
3b (n= 2)	4.2	2.9	5.8	2.5	7.8	1.4	5.9	2.3	3.6
4a (n= 7)	4.8	3.0	7.8	2.2	8.5	1.2	7.0	2.1	3.7

Note: Mean scores were based on the score from each task (=10)
Group type: 1a = collaborative, 1b = collaborative with one absent, 3a = dominant expert/passive novice, 3b = dominant novice/passive expert, 4b = active expert/novice

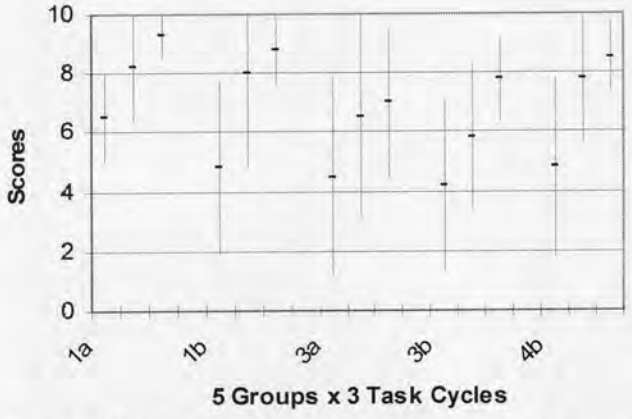


Figure 4.19 Re-inde task type: Illustration of Mean scores and standard deviation showing the performance and development of the five groups

The purpose of Re-inde task type is to observe the students' individual performance in the same task as they have done before with their groups. It can be assumed that their contribution to the completion of task type 1 related to their performance in Re-inde task type. This assumption is supported by the performance of students in group 1a, 1b and 4b in task cycle 3. The majority of students achieved a high level in task performance. As well, their levels of achievement are not far different from each other (*SD* = 0.8 (1a), 1.2 (1b), and 1.2 (4b)). However, the students in group 3a showed a wider range of performance. The dominant experts made good progress while the passive novice did not. It is interesting to note that the students' actual development cannot be the only source to assess their growth (potential development level) and this evidence supports Vygotsky's idea of potential development level. Supposing that the dominant experts in group 3a and dominant novices in group 3b gained higher scores than those passive ones in the two groups, English proficiency might affect only those passive students in that the passive novices in group 3a has less chance to achieve the same level as those passive experts whose achievement is due to their actual English proficiency level. In this way, the students' actual level of English proficiency predicted their performance in Re-inde task type believing that the task elicits the students' developmental level. As a result, the students in group 3b showed a smaller difference between those who gained higher and lower scores. However, the performance of dominant students in both groups (experts in group 3a and novices in group 3b) did not predict their achievement. The results showed that some members in group 3b made higher achievement than those in group 3a in the last task cycle. This is where the results agreed with Vygotsky's idea of potential development that cannot be predicted from the actual development but environment. Group patterns, in this way, might have an influence on the student's development. More explanation can be made in the correlation analyses of the HybridNTELL model predictive variables (See 4.4).

Task type 3: proactive-interdependent (Pro-inter). Due to the nature of the task that let the students take control of their own learning and imposed them to work cooperatively in group, this task type might be more difficult than reactive task types (Re-inter and Re-inde). Hence, the students' performance in Pro-inter task type started at the lower level than the other task types. However, the results show similar traits of students' performance and development in Pro-inter task type to the reactive task types. The three groups: 1a, 1b, and 4a showed better performance and development

than the other two groups: 3a, 3b. Similarly, group 3b made a better progress (Dev = 4.5) than group 3a (Dev = 3.5).

Table 4.13
Pro-inter task type: Mean scores and standard deviation showing the performance and development of the five groups

Group types	Task cycles						Total		Dev
	1		2		3				
	M	SD	M	SD	M	SD	M	SD	
1a (n=13)	3.5	2.8	7.5	2	9	0.8	6.7	1.9	5.5
1b (n= 3)	3.5	2.5	7.0	2.8	8.5	1.0	6.3	2.1	5.0
3a (n= 3)	3.0	3.4	4.5	3.2	6.5	2.5	4.7	3.0	3.5
3b (n= 2)	3.0	1.5	4.2	2.5	7.5	1.8	4.9	1.9	4.5
4a (n= 7)	3.5	2.0	6.5	2.5	8.5	1.2	6.1	1.9	5.0

Note: Mean scores were based on the score from each task (=10)
Group type: 1a = collaborative, 1b = collaborative with one absent, 3a = dominant expert/passive novice, 3b = dominant novice/passive expert, 4b = active expert/novice

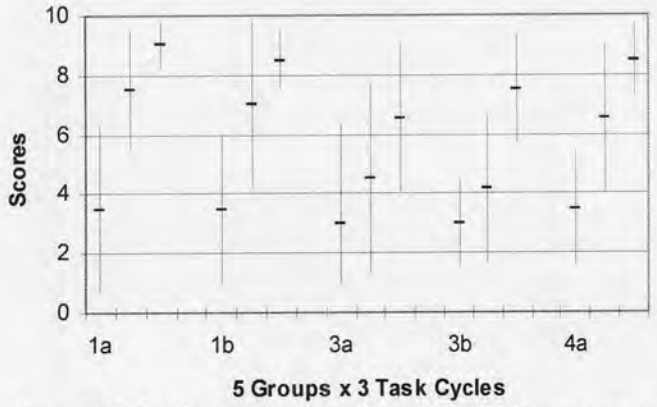


Figure 4.20 Pro-inter task type: Illustration of Mean scores and standard deviation showing the performance and development of the five groups

The standard deviation of students' performance in Pro-inter task type is larger than that in the other task types. The students might perceive task difficulty or complexity differently. Some groups managed to do well from the beginning while some might struggle with the task. The other reason for a wider range of standard deviation is that the scores for this task were assigned both individually and collectively in groups, that is, each member's performance account for group scores.

Similar to Re-inter task type, the collaborative group reported that at the beginning they struggled on making consensus among the members who were holding full accountability to the group. From an informal retrospective interview during class conference, the collaborative groups (A3, A4, B1, B7, C5, C8, except B8) addressed the problem of members contributing too many interesting ideas to make a settle-down within a limited period of time. Similarly, some of the active expert/novice

group (A1, A8, A9, C2, C4, C7) also voiced the same problem. All of them except C4 later changed into collaborative groups.

Task type 4: proactive-independent. Pro-inde task type is far different from the other three task types in that achievement was drawn from the students' individual self-directed learning outcome. Although the similar pattern where the three groups: 1a, 1b, 4b demonstrated better performance, in this task type, the other two groups: 3a and 3b's performance appear to reach at a closer degree to the other three groups. This task type leaves each individual more space and time to make progress along their self-directed learning path and pace.

Table 4.14
Pro-inde task type: Mean scores and standard deviation showing the performance and development of the five groups

Group types	Task cycles						Total		Dev
	1		2		3				
	M	SD	M	SD	M	SD	M	SD	
1a (n=13)	5.5	2.5	7.5	1.8	8.7	1.5	7.23	1.93	3.2
1b (n= 3)	5.2	3.2	7	2.8	8.5	2.8	6.9	2.93	3.3
3a (n= 3)	4.8	3.5	5.5	3.4	7.2	2.5	5.83	3.13	2.4
3b (n= 2)	4.5	2.2	6	2.5	8	1.8	6.17	2.17	3.5
4a (n= 7)	5.4	2.5	7	1.8	8.5	1.5	6.97	1.93	3.1

Note: Mean scores were based on the score from each task (=10)
Group type: 1a = collaborative, 1b = collaborative with one absent, 3a = dominant expert/passive novice, 3b = dominant novice/passive expert, 4b = active expert/novice

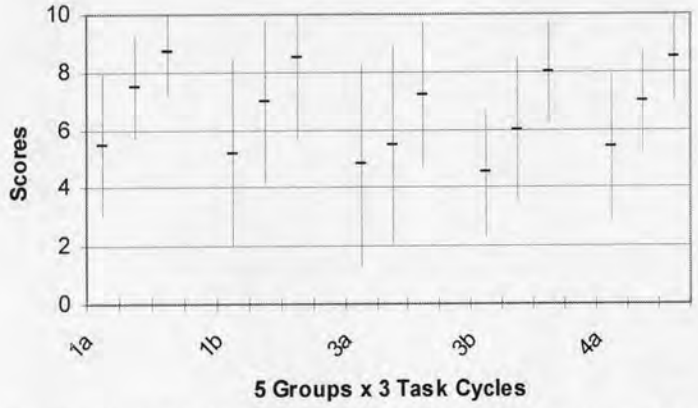


Figure 4.21 Pro-inde task type: Illustration of Mean scores and standard deviation showing the performance and development of the five groups

In pro-inde task type, the standard deviation is great and the range of development varied. Group 3b demonstrated the narrowest range of development while the standard deviation is the greatest. Again, it seems like the dominant experts made good progress while the passive novices remained left behind.

Based on a closer analysis of the students' performance in the four task types, it is assumed that interaction patterns observed mainly from Pro-inter task type

related to students' pattern of performance in the other tasks. However, from social constructivist perspective, it is important to examine what happened during the interaction. According to past studies (e.g. Sotilo, 2004; Fitze, 2006), students' discourse features used in interaction with peers influence or scaffold their development. This study then examined students' discourse in groups with different interaction patterns.

4.3.5 The students' quantity of interaction

The students' quantity of interaction on Pro-inter task type recorded on the classroom online learning management system was examined to see how frequent each group interacted and whether the frequency is related to their achievement. Quantity of students' online interaction involving general online interaction count, number of turns, turn length and number of moves per turn (see Appendix B) were observed. As mentioned earlier in Chapter III, the students take turn being the leaders (editor) each week in Pro-inter task type. The changing roles affected the quantity and types of discourse used by the students. Those who took the leader roles acted differently when they took participant roles. Thus, the investigation was done separately between the time when the students' taking the leading roles and participant roles.

Table 4.15 indicated that students' participation in class is generally over 80% based on their class attendance record. Their online participation ranges from 1,024 to 1,782 counts of interaction on average. The count includes the click when they log on to view any online class materials, post, edit, or delete messages, and submit assignments.

Table 4.15
Students' interaction in general

Group types	Class participation	Online interaction
1a (n=13)	98%	1782
1b (n= 3)	90%	1598
3a (n= 3)	82%	1024
3b (n= 2)	86%	1280
4a (n= 7)	95%	1695
M (n= 28)	90.2	1475.8

Note: All participation is on average among groups with different interaction patterns

Out of all interactions, their messages posted on the discussion boards were examined. The students' posting is the main source of observation on their interaction patterns. When the students' roles were tracked, it appeared that in group 3a and 3b

some students did not take leading roles. Then they were considered *passive* experts or novices based on their presumed English proficiency levels. For this reason, the average number of turns, length of turn and number of turn per move in the two groups were lower than those in the other groups. Those interaction features were observed individually when the students took their roles. Then, all numbers were calculated on average in groups.

Based on the results (see Table 4.16), when taking the leading roles, the collaborative groups took the largest number of turns ($M = 22.25$, $SD = 3.27$) but the expert/novice groups took longer threaded turns ($M = 4.90$, $SD = 2.24$) than the other groups. The three groups: 1a, 1b, and 4b made more number of moves per turn than the other two groups: 3a and 3b. However, the standard deviations in all features are larger in group 3a. It is assumed that the differences were caused by inequality in the role of participants. The experts' dominance when taking leading roles might hinder the passive participants' roles. The same situation might not occur in group 3b where the novices became dominant.

Table 4.16
Students' interaction when they take the leading roles

Group types	Turn Count		Turn Length		Move/Turn	
	M	SD	M	SD	M	SD
1a (n=13)	22.25	3.17	4.20	1.56	10.22	3.80
1b (n= 3)	17.50	4.13	4.50	1.71	12.67	4.22
3a (n= 3)	8.75	4.87	3.20	2.30	7.35	5.80
3b (n= 2)	15.45	3.11	3.50	2.16	7.64	3.50
4a (n= 7)	20.10	3.59	4.90	2.24	11.56	4.34

Note: All participation is on average among groups with different interaction patterns

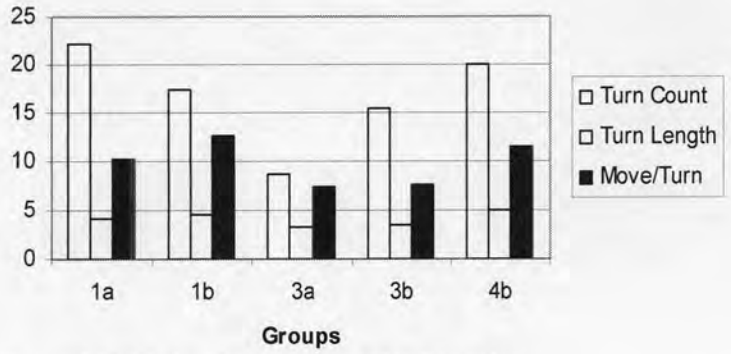


Figure 4.22 Students' interaction in leading roles

Figure 4.22 visualizes the differences among the five groups. Counting the number of turns revealed that group 1a and 4b produced more interaction than the other groups. However, when looking at the length of threaded turns and the number of moves per turn, group 1b and 4b showed more evidence of these two features than

the other groups. Although the length of threaded turns and the number of moves per turn observed in group 3b are similar to those in group 3a, group 3b produced more turns of interaction than group 3a.

When the leaders became participants, all number of interaction features dropped. However, the groups with no passive participants (1a, 1b, and 4b) still showed collaborative turns and moves. They still made a good number of turns and responded to their leaders in threaded discussions.

Table 4.17
Students' interaction when they take the participant roles

Group types	Turn Count		Turn Length		Move/Turn	
	M	SD	M	SD	M	SD
1a (n=13)	9.35	3.06	4.10	1.83	3.20	1.52
1b (n= 3)	10.40	5.60	4.50	2.51	3.15	1.88
3a (n= 3)	7.85	2.70	3.60	0.81	1.75	0.46
3b (n= 2)	8.30	2.44	3.90	1.62	2.25	0.82
4a (n= 7)	10.20	4.81	4.20	1.89	3.50	1.75

Note: All participation is on average among groups with different interaction patterns

However, it is noted that when analyzing the role of the participants, the two groups: 3a and 3b showed less difference in all features of interaction. Figure 4.24 presents a clearer picture of the results. As mentioned above, I observed that the dominant participants took turn to act as both the leader and the participant.

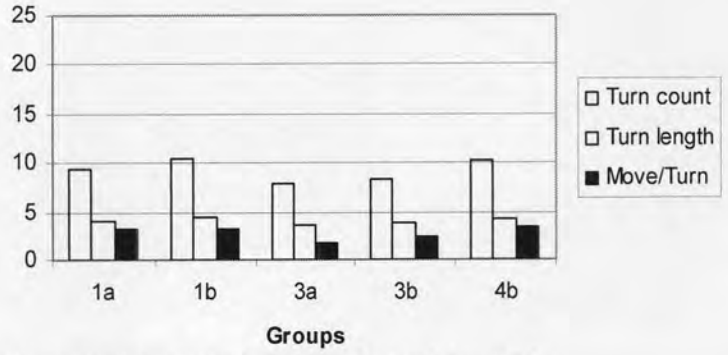


Figure 4.23 Students' interaction in participant roles

The students' interaction observed from the number of turns, the length of threaded turns and number of moves per turn provided a preliminary discussion of students' interaction related to their performance and development. The scaffolding discourse types found in the students' interaction let us take a closer look of whether and how their scaffolding moves related to their class performance and development.

4.3.6 The students' scaffolding discourse types

Apart from examining quantity of students' interaction, it is important to further investigate which types of discourse were used by the students when they were engaged in asynchronous online interaction in order observe which types were prominent in predicting students' development.

Table 4.18 shows discourse types found in students' interaction on the electronic discussion board as an initiator and a respondent. As initiators, the students produced such discourse as positive comment, critical feedback, corrective feedback, metatalk, fostering autonomy, request for clarification, and giving directives. Fostering autonomy is different from giving directives in that the initiator provides sources or suggestions based on their own judgment and experience to help the respondent conducting self-directed learning which is considered more crucial than simply giving directives. Two types of discourse found in respondents' move are accepting comment, feedbacks or any change suggested; and negotiating based on their explanation, supporting evidence and justification.

Table 4.18
Discourse types in students' interaction: definition and examples

Initiator's discourse type		
Discourse	Definition	Examples
Positive comment (PC)	Reacting by giving positive and supportive evaluative comments about specific or general aspects of the text	-Your work is creative. -I like the links you gave in your writing. -I like the movie links you put there is fun. -Your writing has a good flow. You're genius!
Critical feedback (CF)	Reacting by giving critical comment for change or improvement	-I think you should make your story more interesting by linking it to video clips -You don't have the introduction so it makes the reader confused what you want to say
Corrective feedback (Co)	Going beyond advising by composing new sentences for the writer or offering specific solutions	-You can't use "in addition" to change the topic from similarity to difference. Try to think about the conjunction that show the contrast such as however, but, on the other hand...
Metatalk (MT)	Including only instruction without correcting	-Please check your past tense verb spelling. -You need to add articles in your writing.
Fostering autonomy (FA)	When the learners advice their peer to employ self-monitoring skills in writing or suggest sources of lessons where they can learn from	-You should use MS Word to check your spelling before sending your work to the forum -Please check word spelling from the Collins COBUILDs
Giving directive (GD)	Ordering peer to take action	-I'd like you to correct them.
Request for clarification (RC)	Asking interlocutor's to clarify meaning	-Did you mean 'canoeing'? -Is this what you want to say... GT is more challenging than other competitions?

Responder's discourse types		
Responding to advice (RTA)	Accepting changes or solutions	-Thank you for your help. I've corrected them. -Okay. I'll change it.
Negotiate (NE)	Questioning the rationale and validity of the advice or justifying by explaining or defending choices or decisions made about the text	-Do you think I should add more information about the game? I think it's too long already -GT is very famous. I don't think I should explain too much about it because it will be boring. -They use the word 'kayak' in Krabi. I think 'canoe' is for river.

The number of discourse moves was observed in all three cycles of Pro-inter task type. The groups were examined as a unit in this section so that the reader gets an overview of class ecology. However, the analysis of discourse type related to students' development is discussed in the multiple correlation analyses (See 4.4). For the intra-group interaction, the frequency of each discourse type was observed as co-construction moves in two-way interaction. For the inter-group interaction, the frequency of discourse type was observed separately from the number of moves in message sent to or received from other groups.

4.3.6.1 Intra-group interaction and discourse types.

Figure 4.24 and Table 4.19 illustrate intra-group interaction and discourse types found in groups according to their interaction patterns. The results show that the frequency of positive comments (PC) and critical feedbacks (CF) are not different among five interaction patterns. However, corrective feedbacks (Co) were more frequently found in group 1a, 1b, and 4a than the other two groups. Metatalk (MT) were again found equally and more frequently in group 1a, 1b, and 4a. Fostering autonomy (FA) type was found more frequently in group 1a, 4a and 3a but less frequently in group 1b and 3b. Giving directive (GD) type was found more frequently in group 3a, 3b and 4b, the groups with inequality in participants' roles. Requesting for clarification (RC) type was found frequently in group 1a, 1b, and 4a. The RC type was found more frequently in group 3b than in 3a.

The last two discourse types were found in responsive turns. Responding to advice (RTA) and negotiating (NE) types were found more frequently in group 1a, 1b, and 4b where all participants are active. Both RTA and NE types were found more frequently in group 3b than in 3a.

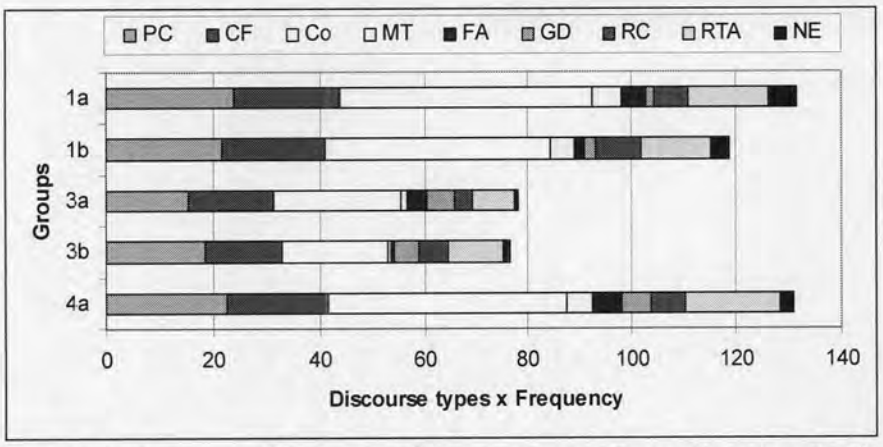


Figure 4.24 Frequency of intra-group discourse types on average in each cycle of task

Table 4.19
Frequency of intra-group discourse types on average in each cycle of task

Group types	PC	CF	Co	MT	FA	GD	RC	RTA	NE
1a (n=13)	23.75	20.25	48.55	5.60	4.50	1.60	6.70	15.25	5.50
1b (n= 3)	21.55	19.45	43.25	4.80	1.80	2.30	8.50	13.55	3.50
3a (n= 3)	15.25	15.95	24.10	1.50	3.60	5.40	3.50	8.21	0.50
3b (n= 2)	18.45	14.33	20.25	0.50	0.50	4.70	5.70	10.75	1.20
4a (n= 7)	22.50	19.25	45.60	5.20	5.60	5.60	6.50	18.20	2.40

The analysis of discourse types and frequency also agree with the performance and development found in five interaction patterns in HybridNTELL. The patterns of three groups: 1a, 1b, and 4b, different from the two groups: 3a and 3b in that they show more density of scaffolding among members of the group. The results from students' discourse analysis show that the pattern of interaction related to such internal variable as discourse types are still consistent with the earlier investigation.

4.3.6.2 Inter-group interaction and discourse types.

In Pro-inter task type, the students were also asked to respond to work done by other groups individually and collectively. It is also interesting to examine how they interact with the outer circle of environment (the class) and how those interactions related to their intra-group performance and development. Table 4.20 described the students' interaction between groups in the roles of sender of messages and receiver of messages. The results also showed that the most active group is still group1a in terms of inter-group interaction. Two discourse types rarely found were responding to advice (RTA) and negotiation (NE). This might be due to limited time that we needed to allocate for three task cycles.

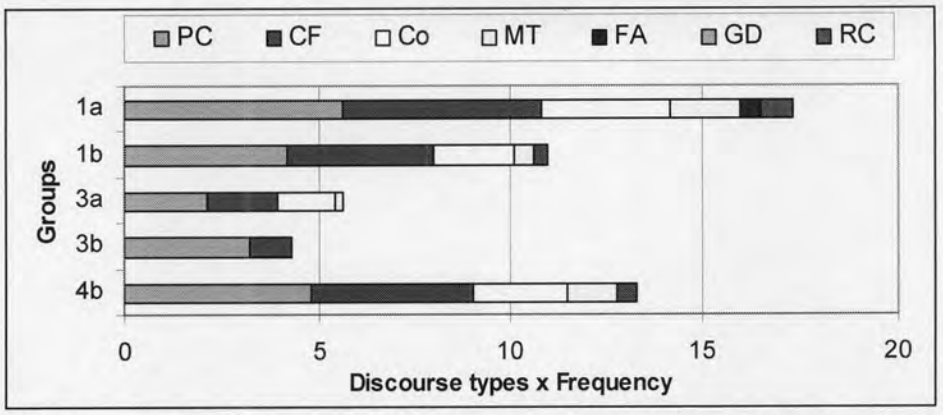


Figure 4.25 Frequency of inter-group discourse types on average in each cycle of task: an investigation of messages sender

Table 4.20
Frequency of inter-group discourse types on average in each cycle of task: an investigation of messages sender

Group types	PC	CF	Co	MT	FA	GD	RC
1a (n=13)	5.6	5.2	3.4	1.8	0.5	0	0.8
1b (n= 3)	4.2	3.8	2.1	0.5	0	0	0.4
3a (n= 3)	2.1	1.8	1.5	0.2	0	0	0
3b (n= 2)	3.2	1.1	0	0	0	0	0
4a (n= 7)	4.8	4.2	2.5	1.3	0	0	0.5

The results show that only group 1a demonstrated all discourse types in their inter-group interaction. However, the distinguished fostering autonomy type appeared in the lowest frequency comparing to the other discourse types produced by the group. Group 3b, despite similar frequency of intra-group discourse use, demonstrated the lowest frequency and least type of discourse use.

However, the students selected to respond to the other groups almost equally. Group 1a received the widest range and the most frequent respond from other groups (which might include the other groups with the same interaction patterns). Group 4b received the least frequent respond from other groups. This might be due to the fact that their work was done well. They received a good amount of positive comments comparing to the other groups with low critical feedback, corrective feedback, metatalk, and request for clarification all of which relates to low quality of work.

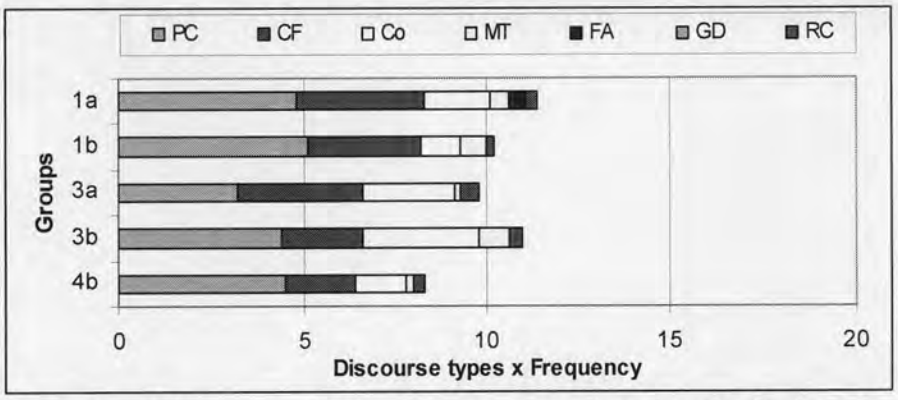


Figure 4.26 Frequency of inter-group discourse types on average in each cycle of task: an investigation of messages receiver

Table 4.21
Frequency of inter-group discourse types on average in each cycle of task: an investigation of messages receiver

Group types	PC	CF	Co	MT	FA	GD	RC
1a (n=13)	4.8	3.5	1.8	0.5	0.5	0	0.3
1b (n= 3)	5.1	3.1	1.1	0.7	0	0	0.2
3a (n= 3)	3.2	3.4	2.5	0.2	0	0	0.5
3b (n= 2)	4.4	2.2	3.2	0.8	0	0	0.4
4a (n= 7)	4.5	1.9	1.4	0.2	0	0	0.3

Although we cannot use the students' inter-group discourse types to judge or predict students' performance and development, the results at least indicate the type of discourse and frequency of interaction demonstrated by groups with different interaction patterns.

4.3.7 Degrees of teacher's help

Based on social constructivist theory, help or "assisted learning" is one of the most important ingredients in learners' performance. In HybridNTELL model, language learning is emergent from tasks. The learner learns how to use English; not learn the English language mechanism or linguistics which they have done for almost ten years. The teacher's role is to provide supports to learners (see Chapter III) who were working with different types of task. Degrees of teacher's help despite being predetermined in different task types vary according to students' interaction patterns. First, the teacher's help is provided in written feedbacks. The aim is to suggest the students' how to improve the content and language. The feedback was double checked by another independent rater to ensure its congruence and benefit to the students. Then, when the students received the feedback, they are allowed to adjust their work and resubmit the second draft to the teacher. They can ask the teacher for further advice if the feedback is not sufficient for them to improve their work. However, the second draft is optional. The students might want to allocate their time

to other tasks if they were satisfied with their learning outcome. If the teacher did not receive the students' second draft, the first draft was graded as the final draft. Then the scores assigned by the teacher were double checked by the second teacher. Overall exact scale-point agreement between the two teachers for the students' task evaluation must be at least 90%. Otherwise, the teachers did a conference over the discrepancies found in their rating of students' work to find a consensus on their ratings.

In HybridNTELL model, the teacher is allowed to provide help during the class conference for the three task types: Re-inter, Pro-inter and Pro-inde task types. Degrees, frequency and types of help were recorded while providing feedbacks and during class conference when the students ask for further help. Based on the assessment scheme (see Table 3.4), teacher's help was evaluated as a part of the students' task performance. This responds to social constructivist theory suggesting that students' show different degree of their potential development observed from the degree of help they require. The followings describe an analysis of teacher's help provided in the three different task types based on students' interaction patterns.

Teacher's help: task type 1 (reactive-interdependent)

In Re-inter task type, the teacher's help was provided for students in groups. First the teacher gave feedbacks to the students' written tasks. The students' in groups decided if they need to resubmit a second draft or ask for further help. If they do not resubmit a second draft, their score on the first draft is assigned to inform their task performance and the highest rank of help on the scales (see Table 3.4) is assigned. If they resubmit the second draft, the lower rank of help on the scales is assigned and the evaluation is based on their second draft. If they need any further help, degrees, frequency and types of help they required is recorded and included as a part of the evaluation. In this way, a students' task also reflects the degrees of help, frequency and types they required to complete the task.

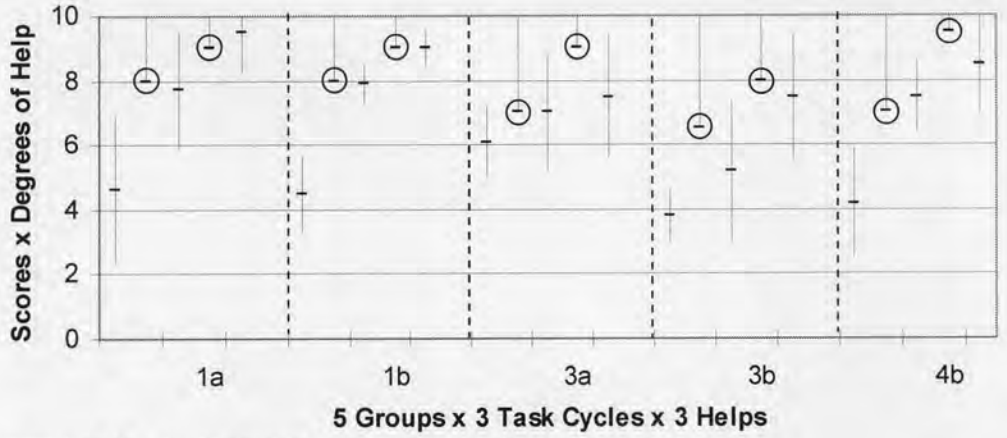


Figure 4.27 The teacher's help provided in Re-inter task type

Figure 4.27 presents the degrees of teacher's help illustrated by the circle at the end of each plot. The higher the circle is, the less degree of help the students required and the higher scores the students gained for less help required. The results show that group 1a and 1b required the same pattern of help (First draft = 8 and second draft = 9). Group 3b required the highest degree of teacher's help to fulfill the lack of active expert comparing to group 3a who required less help because active experts take the dominant roles. The teacher's help appeared to benefit group 3b with an assumption that the degrees of teacher's help relates to the students' potential development. Despite the lack of active expert, group 3a performed as well as group 3b requiring more degrees of teacher's help. It is noted that group 4b required the least help in second draft and this is probably due to the fact that the experts can provide help to the members and the help was agreed by the members. Supporting evidence from an unofficial observation is that most of the time group 1a and 1b required the teacher's help to solve the conflict among group members.

Teacher's help: task type 3 (proactive-interdependent).

In Pro-inter task type, the students had been producing their work through collective scaffolding in groups before the teacher's help was provided. Similar to Re-inter task type, the teacher's help was recorded when the students reacted to the help or requested more help. Figure 4.28 shows that the students needed a higher degree of help in Pro-inter task type than in Re-inter task type. The results reflected the nature of Pro-inter task type which requires active self-directed learning. Most students never experienced this type of task and required more help from the teacher at the beginning. The results show that overtime the students managed to complete the task with less degree of teacher's help provided that they worked in an active and collaborative team.

The evidence was found in the difference between group 1a, 1b, and 4a and group 3b. Group 3a required a different pattern of help from the teacher. From an observation, the dominant experts can do their task without much help while the passive novice did not ask for help when needed.

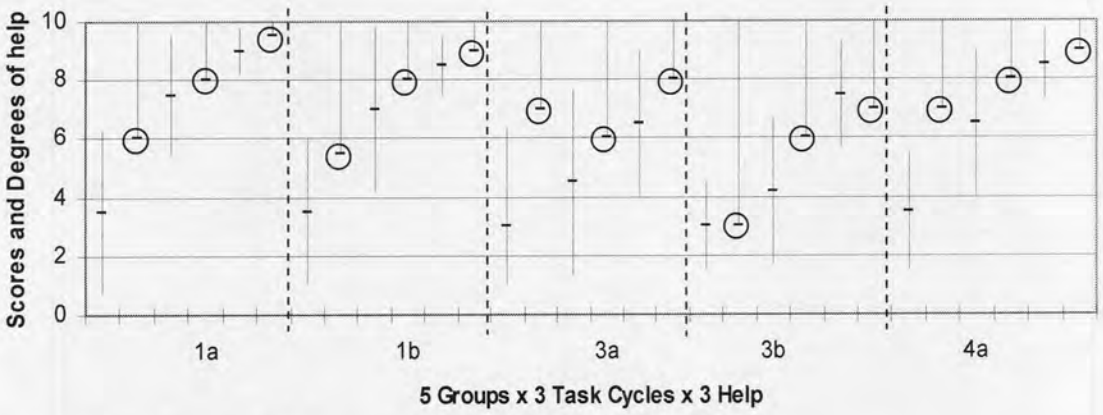


Figure 4.28 The teacher's help provided in Pro-inter task type

Teacher's help: task type 4 (proactive-independent).

Teachers' help provided in Pro-inde task type was only upon the students' request. During the task cycles, the teachers provided feedbacks as to what the students had produced in their portfolio entry of self-directed individual learning. The students are free to direct their own learning by creating their own task to learn, learning goal, learning process, and evaluation of the outcome. The teacher's help provided in the form of feedback aims to guide the students to do better in their next entry. However, resubmitting a second draft is optional for the students who need more help from the teacher in a particular piece of work. Degree, frequency and types of teacher's help was recorded and included in the evaluation of their task performance.

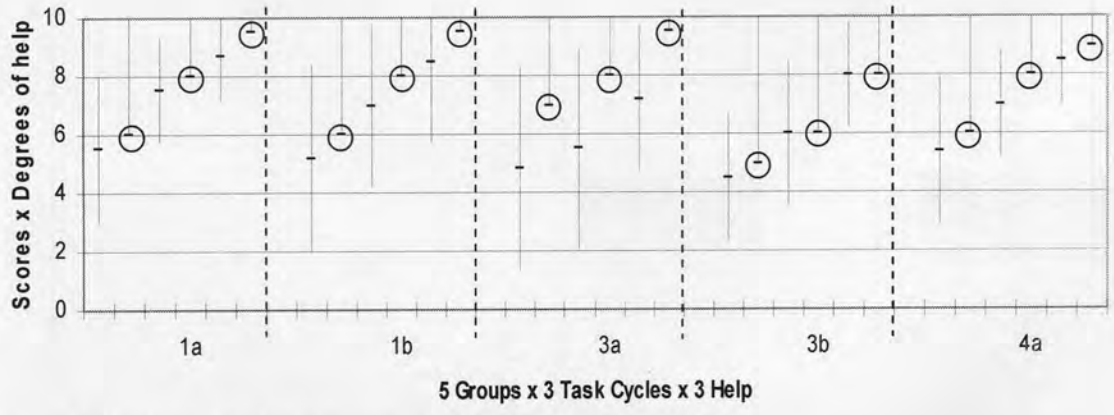


Figure 4.29 The teacher's help provided in Pro-inde task type

Based on results from the Figure 4.29, it is assumed that interaction patterns influence the degrees of teacher's help. Group 1a, 1b, and 4b required less help from the teachers and made good progress in the 3 cycles of Pro-inde task type. Group 3a despite less degree of help made less progress than the three groups (1a, 1b and 4b) and even less than group 3b who required higher degrees of help.

The relationship between degrees of teacher's help and students' development is examined next the correlation analyses of the HybridNTELL model predictors (See 4.4).

4.4 The HybridNTELL model predictors of students' development

Since the students showed a significant improvement in English proficiency and achievement in curriculum-based test, I investigated if the improvement and achievement are related. The descriptive correlations show that students' development in English proficiency test and their scores on the achievement test share some significant attributes ($r = .76, p < .01$). It is important to examine the shared features that contribute to students' good performance in both tests and some distinct features that benefits either English proficiency or achievement alone. A series of multiple regression analyses were conducted. This allows for an examination of the structure of the relationships among the variables (see Table 4.22) as well as improvement or adjustment of some variables in HybridNTELL model. The data of each variable collected from 90 participants were used as independent variables to perform bivariate correlation analyses. The dependent variables are the students' development in English proficiency between pre-and posttests and their scores on the achievement test.

The students' performance and development in the four task types of HybridNTELL model is the first important set of variables to be investigated to ensure relationship between the model and the two dependent variables: the students' improvement of English proficiency and their achievement. Bivariate correlation analyses were conducted to examine the relationships between the variables.

Table 4.22
Bivariate correlations between the students' performance and development on four task types and their development in English proficiency and achievement

	Development in English proficiency	Scores on the achievement test
Scores on the Achievement test	.76**	
Performance	.58**	.65**
Task type 1	.24	.30
Task type 2	.46	.43
Task type 3	.62**	.71**
Task type 4	.54*	.42
Development	.72**	.86**
Task type 1	.24	.47
Task type 2	.52*	.56*
Task type 3	.73**	.79**
Task type 4	.61**	.52*

* $p < .05$
** $p < .01$

Although not all relationships were significant, overall task performance and development were significantly associated with the students' English proficiency development and achievement. Furthermore, both performance and development in Pro-inter task type shows the strongest relationships with both tests: English proficiency test ($r = .62, p < .01$ and $r = 73, p < .01$) and achievement test ($r = 71, p < .01$ and $r = 79, p < .01$). Since the students' development in all task types shows a higher correlation with the two test scores: development in proficiency test scores ($r = .72, p < .01$) and achievement test scores ($r = .86, p < .01$) than the students' task performance: development in proficiency test scores ($r = .59, p < .01$) and achievement test scores ($r = .65, p < .01$), the students' development in task types was examined more closely to predict the possible relationships with the other variables.

To reduce the total number of variables used in the regression analyses, five bivariate correlations were conducted with five sets of related variables (based on classroom ecology): (1) the interaction patterns the students experienced, (2) the students' online interaction behavior in Pro-inter task type, (3) the students' discourse types used, (4) the students' discourse types received, and (5) the degrees of teacher's help in three task types.

Students' participation. The relationship between all students' participation and their overall development in tasks were not significant ($r = .13, p = .15$).

Interaction patterns the students experienced. The relationship between interaction patterns and overall students' development in all task types were

significant ($r = .65, p < .05$). The interaction patterns were also highly associated with the students' development in Re-inter task type ($r = .75, p < .01$), Re-inde task type ($r = .47, p < .01$), Pro-inter task type ($r = .83, p < .01$), and Pro-inde task type ($r = .45, p < .05$). The strongest relationship was found between the students' interaction patterns and Pro-inter task type.

Online interaction behavior. The students' development in all task types was not associated with turn count ($r = .13, p = .24$) but the development was associated with turn length ($r = .46, p = .05$) and number of move per turn ($r = .65, p < .01$).

Discourse types. Two analyses were conducted with different set of discourse types. The first set was the discourse types investigated from the messages students addressed on the discussion board. Four discourse types associated with the students' development in task types were critical feedback (CF) ($r = .52, p < .05$), corrective feedback (Co) ($r = .73, p < .01$), metatalk (MT) ($r = .49, p < .01$), and fostering autonomy (FA) ($r = .56, p < .01$). The total number of discourse types students addressed was also associated with their development in tasks ($r = .51, p < .05$). The second set of discourse types was investigated from the messages students was addressed to on the discussion board. Three discourse types associated with the students' development in task types were positive comments (PC) ($r = .71, p < .05$), critical feedback (CF) ($r = -.29, p < .05$), and corrective feedback (Co).

Teacher's help. Negative relationships were found between the students' performance and the degrees of teacher's help they required. The more help the students need, the less ability they demonstrated in task completion. The strongest association was found between the teacher's help and the students' development in Pro-inde task type ($r = -.69, p < .05$). The teacher's help in Pro-inter task type was also correlated with the students' development but with a lesser degree ($r = -.54, p < .05$). The correlations found between Re-inde task type development and degrees of teacher's help is not significant ($r = -.24, p = .19$) and similarly in Re-inter task type ($r = -.37, p = .11$). In reactive task types, the teacher's help did not relate to the students' development because students learned through collective scaffolding and the tasks were highly structured. In fact, they did not need much help and the requirement of help from the teacher was random and not related to the more or less degree of development. However, Pro-inde task type elicited the students' highest degree of learning autonomy. The lesser ability they had in self-directed learning, the more help they required from the teacher or possibly more capable peers.

From the correlation analyses above, all variables showing significant relationships with the student's development in overall task types were included in a multiple regression analysis. The analysis was used to explain about the two dependent variables using the five sets of independent variables. Such related variables of interaction patterns as types of interaction, students' role, turn counts, turn length, move count per turn, turn types and teacher's help were then included.

The overall relationship between the five predictors and the two dependent variables reported as .87 for the improvement in English proficiency and .96 for the achievement test scores. This means 76% of the variance in the students' development of proficiency test scores can be explained by these five predictors and 92% of the variance in the students' achievement test scores can be explained by these five predictors.

As shown in Table 4.23, better performance on the English proficiency and achievement test were associated with all variables. The students' development in task performance is the strongest predictor of both improvement in their English proficiency ($R^2 = .37, p < .001$) and achievement test scores ($R^2 = .39, p < .001$). The second predictor for the improvement in students' English proficiency is the interaction patterns they experienced ($R^2 = .14, p < .001$). The next equally important predictors are the discourse types they use and the teacher's help ($R^2 = .13, p < .001$). The students' online interaction ($R^2 = .06, p < .01$) and discourse types received from peers' feedback ($R^2 = .04, p < .05$) are the weakest predictors.

As for the students' achievement test scores, the third predictors are their group interaction patterns ($R^2 = .16, p < .001$), and degrees of teacher's help ($R^2 = .16, p < .001$). The next almost equal important predictor is their discourse type use ($R^2 = .15, p < .001$). Online interaction ($R^2 = .05, p < .01$) and discourse type received from peers' feedback ($R^2 = .05, p < .01$) remain the equally weakest predictors for the students' achievement test scores.

Table 4.23
Summary results of regression analyses for variables predicting students' improvement in English proficiency and achievement test scores (N = 90 students)

Variables	Improvement in English proficiency			Achievement test scores		
	Coeff.	Beta	R^2	Coeff.	Beta	R^2
All Tasks development			.37***			.39***
Type 1	.38	.32*		.65	.58**	
Type 2	.64	.44*		.71	.67**	
Type 3	.81	.76**		.87	.83***	
Type 4	.59	.59**		.42	.35	
Interaction patterns	.31	.24***	.14***	.39	.27***	.16***
Online interaction			.06**			.05**
Turn length	.38	.17*		.23	.12*	
Move/Turn	.51	.27**		.61	.36***	
Discourse type						
Addressing			.13***			.15***
CF	.35	.29*		.38	.32*	
Co	.57	.47**		.69	.51**	
MT	.12	.04		.18	.11	
FA	.29	.18*		.34	.24*	
Being addressed to			.04**			.05**
PC	.53	.46**		.69	.51**	
CF	-.14	-.11		-.36	-.29*	
Co	-.25	-.19*		-.49	-.4**	
Teacher's help			.13***			.16***
Content	.48	.36**		.69	.51***	
Language	.73	.62***		.78	.45***	
R^2			.87			.96
F			63.03***			81.54***

* $p < .05$.
** $p < .01$
*** $p < .001$

The summary of regression analyses for variables predicting students' improvement in English proficiency and achievement test scores indicated that the variables addressed in classroom ecology analysis are important to investigate the students' potential development in their English language learning as they are closely related to both students' improvement of English proficiency and their curriculum-based achievement.

4.5 The students' perception towards the HybridNTELL environment

HybridNTELL model with an integration of Moodle for course management system created an active and supportive learning environment in which students interacted socially with each other as they expanded their use of the target language beyond the classroom. Most of the students praised the unique learning community

created by HybridNTELL model, a community in which they learned from each other. Being able to work and share opinions with others was a valuable concomitant benefit of online exchanges. The students acknowledged that Moodle made communication very efficient and effective because they were able to receive responses and constructive feedback from their peers although they were not arranged to meet face-to-face. Furthermore, all interactions were recorded and could be retrieved anytime. The following summary of students' perception were drawn from the open-ended questionnaire distributed at the end of the course.

The students' perceptions towards HybridNTELL model was investigated from their answer to three open-ended questions:

1. What do you like about this course?
2. What do you dislike about this course?
3. How should this course be improved?

The students can choose to answer or not to answer any question. The answers can be in Thai or English. 138 students returned the questionnaire. 136 students answered the first question. 54 students answered the second question and 18 students answered the last question. Table 4.23 shows the students' perceptions towards HybridNTELL model. The answers in Thai were translated into English. The translation was double checked by another independent Thai-English proficiency speaker.

The students' answers were categorized into three sections: (1) They like this course because…, (2) They do not like this course because…, (3) They think this course should …. Similar answers were grouped together.

Table 4.24
The students' perceptions towards HybridNTELL environment

They like this course because...	(n = 136)
1. They felt like their work sprung out from meaningful communication (e.g. I write better because I know my friends are reading it, I write better because someone may read my website, I make it more interesting and fashionable to my friends because I know not only teacher read it.)	52
2. They can link some content to multimedia resources which make it more appealing to the audience (e.g. I can link to video files to make my work more interesting. I can include picture to help my explanation to be clearer. I can link to video file to entertain my audience)	26
3. They can search for more information on the topic of their interest in peers' work (e.g. I can click on links that my friends gave and know more about interesting stuff, I don't have to read all information that may be interesting to others but not me...my friends can hide them in the link)	43

4.	They learn how to manage their team work	58
5.	They worry less about their peers' reaction (e.g. We can say what we want and express our thoughts directly", "while giving feedback [on the computer], I feel free to say anything I wanted to say without worrying about my friends' reaction."	41
6.	They can see others' work so they know how to make their work more or equally interesting to compete with others	29
7.	They don't have to be on campus late at night because they can do it online at home.	71
8.	They don't have to worry if their schedule didn't match because they can submit work to their friends and they can see it anytime when they're free.	96
9.	They can share files on the website and everybody in their group can have it	21
10.	They realized that the teacher can observe passive members in groups so they tried not to be lazy. (e.g. teacher can see who submit work late and she will talk to them for me)	16
11.	They feel like they have a modern learning method than those in other university	8
12.	They can change, edit or modify their work any time (e.g. it's easy to change any points I think not appropriate. It's easy to add whatever I want to express. It's clear to see my point to my peer's paper)	34
13.	They don't lose the old version of their work because they submitted it online and it can be retrieved anytime	25
14.	They don't have to be afraid that their work will be copy if they put it first online. The past record on the system is the evidence who is the owner of the idea.	13
15.	They feel that seeing others' work let them learn some new ideas that they can make use of in the future.	7
16.	They feel that they can contact the teacher more easily because they don't have to run to teacher's office	14
17.	They have later deadline than other class because they can submit their work online in weekends which is their convenient schedule.	9
18.	They can download their work submitted online anywhere anytime and don't have problems forget to bring their work to the class	3
19.	They learn more computer skills	34
20.	They learn from their friends' mistakes in some forms of language that they have never used	19
21.	They learn from friends comment	32
22.	They are proud when realizing that their work is appealing to and appreciated by their friends	16
23.	They learn the language forms in use (e.g. I can try using new grammar in the first draft to communicate my ideas. My friends can correct it for me. If they can't, we will ask the teacher to do it for us)	21
24.	They have friends who can enhance their achievement (e.g. I can do my work more creatively when I have my friends who is good at computer graphic help me with my work and I can learn the skills from him)	12

They do not like this course because ...	(n = 54)
1. They had too much workload	43
2. They had to come to class before the class hours because they want to make sure the Internet was ready for their presentation.	11
3. They had to spend too much time on the graphic design for the task to make it appealing to the readers	27
4. They had to spend too much time on uploading work when the internet connection was bad	46
5. They feel that their friends were far better than them in English and hard working so they had to work harder or their friends would be upset.	16

They think this course should	(n = 18)
1. increase class contact hours	12
2. have more activities that allow them to talk to the native speakers or non-native speakers who speak English	8
3. include some online distant activities that allow them to do projects with students from other countries (they gave an example of the activity we had once in class when I asked my Japanese friend to let his students in Waseda University to chat with this group of Thai students and I suggested the students to include this activity in their portfolio)	16
4. reduce other subjects so they can have more time on English	4

The students' perceptions towards the HybridNTELL environment are mostly related to their interaction in groups and class. For example, the students' positive attitude number 23 show that students working alone can complete simple assignments, learn simple procedures and information, and engage in well-learned behaviors. When new and complex knowledge and skills need to be mastered or extraordinary effort is needed, however, learning group is necessary. Also evidence supported that groups can raise individuals' levels of aspirations. Groups can inspire individuals to achieve beyond their wildest expectations. Groups can give individuals insights and understandings that could never be achieved alone.

The negative attitudes the students addressed show how much effort they put on the work. Although those five answers were categorized into negative attitudes, they are considered positive for HybridNTELL model as it encouraged students to put effort and be responsible in their learning. The students' suggestions especially number 2 and 3 are worth thinking about. They show that the students need to be exposed more to the target audience and they see the potential of online learning that can facilitate their needs.