

## CLUSTER ANALYSIS OF ADOLESCENT BLOGS

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### ABSTRACT

Emerging web applications and networking systems such as blogs have become popular, and they offer unique opportunities and environments for learners, especially for adolescent learners. This study attempts to explore the writing styles and genres used by adolescents in their blogs by employing content, factor, and cluster analyses. Factor analysis was used to identify the factors that influence the genres of adolescents' blogs, and cluster analysis was used to divide the adolescents' blogs into the topic balanced group and the expression of feelings group. The findings revealed that the two groups of adolescents showed a difference in blog background, genres, and use of Internet language variables. Additionally, female adolescent bloggers tended to post more articles than male bloggers. Furthermore, the number of posted articles between female and male adolescents varied in some genres.

**Keywords:** blog, adolescent blogger, adolescent blogs, cluster analysis, Web 2.0

### INTRODUCTION

Blogging has gained in popularity and has become a valuable part of the learning environment network in the Web 2.0 era, where learners are able to conveniently post articles with text, graphics, and other multimedia components on the Internet (Ellison & Wu, 2006; Liu & Chang, 2010; Liu, Ho, & Song, 2011; Lou, Wu, Shih, & Tseng, 2010; Mouhtouris, 2006; Schmidt, 2007; Tan, Ladyshevsky, & Gardner, 2010). In this respect, O'Reilly (2005) has highlighted several characteristics of Web 2.0, such as the web-based platform, which harnesses collective intelligence and enriches the experiences of its users. In other words, in the Web 2.0 era, greater attention is directed toward learners as their preferences are given greater consideration, and services are provided that meet the varying and diverse needs related to learning and instruction.

A blog can be broadly defined in two ways: its usage and its function. With respect to usage, a blog can be considered a type of diary that incorporates a rich corpus of multimedia information and is maintained on the web by its users so they can share their thoughts with other users (Blood, 2002; Herring & Paolillo, 2006; Herring, Scheidt, Wright, & Bonus, 2005; Kalelioglu & Gulbahar, 2010; Kiyici, 2010; Liu & Chang, 2010). Additionally, blogs offer an exciting new opportunity to deliver individual opinions, share ideas, interact, and communicate with others on the Internet. Blogs can also be used as a collaborative tool for student groups and instructors as a medium for tasks such as delivering news, messages, and resources as well as a means to encourage discussions and provide feedback and comments (Chen, Liu, Shih, Wu, & Yuan, 2011; Liu, Lin, & Chang, 2010; Shih, 2010; Tilfarlioglu, 2011; Wang, 2010; Weller, Pegler, & Mason, 2005). With respect to

function, a blog contains information regarding delivery functions. These include Really Simple Syndication (RSS), comments, trackback ping, blogroll, and archives (Winer, 2003). Furthermore, a blog is a network where the emphasis is on individuality and where the interface is easy to use so that learners can create their own space (Curling, 2001; Nardi, Schiano, Gumbrecht, & Swartz, 2004; Wells, 2006).

According to the literature, there are numerous ways to classify blogs. For example, a blog can be classified as personal or collaborative depending on the number of blog owners. A blog can also be classified by subject (such as knowledge, war, politics, companies, media, videos, etc.; Fievet & Turrettini, 2004). Blood (2002) identified three basic types of blogs: filter, personal diary, and notebook. These three types are defined as follows:

- (1) Filter: The content of this blog is usually not related to the blogger. For instance, this type of blog records local, national, or international news and current affairs. This kind of blog article, therefore, is a filter in that it reflects the viewpoint of the blogger.
- (2) Personal diary: This type of blog differs from the filter blog in that it records the immediate circumstances of the blogger. For example, the blogger may post personal thoughts regarding an event or post comments relating to some real-life situation.
- (3) Notebook: This kind of blog consists of elements of both the filter blog and the personal diary blog. In this type of blog, articles usually contain more words, and each posting or article is generally topic specific.

The basic classification unit is the blog article; thus, the more filter type articles a blog has, the greater the possibility that the blog will be classified as a filter blog. In the early days of blogging, according to Blood’s viewpoint, the filter type blogs were more common than the personal diary and notebook type blogs. However, as a result of increased blogging in recent times, the personal diary blogs have become much more common and popular.

In contrast to and in conjunction with Blood’s definition, Krishnamurthy (2002) classified blogs into two dimensions: personal/topic and individual/community blogs. These were then further divided into four types. In Blood’s classification, the emphasis was on the individual whereas Krishnamurthy also recognizes a community dimension (Figure 1). For instance, a group of people who blog for various reasons or seek advice (such as new mothers) belong to a blog type called the support group. According to Krishnamurthy (2002), personal journals fall into the online diary type, but Krishnamurthy (2002) further identifies those individuals who select and offer comments in response to the information that they gather on the web. This type of blogger is categorized as the personal comment type (also referred to as the filter type). Finally, those individuals who blog collaboratively with regard to a specific topic or purpose, such as an online game or a computer-related topic, are categorized under the discussion center type.

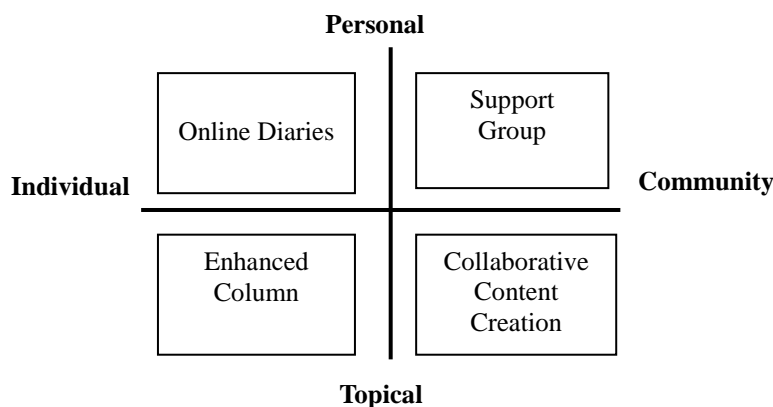


Figure 1: Four different blog types (adopted from Krishnamurthy, 2002)

Additionally, blogs can be classified into three types with respect to its purpose: personal journal, k-log, and filter type (Blood, 2000; Herring, Scheidt, Wright, & Bonus, 2005; Krishnamurthy, 2002). Personal journal refers to recording the blogger’s thoughts, ideas, or things in everyday life, mainly for leaving records or expressing their feelings. A k-log blog implies that its primary content centers on information and knowledge or observations regarding some particular topic or project. Unlike the k-log, the filter type implies that its content consists of evaluations, comments, or ideas from bloggers. In the past, the classification of blogs was

based on the type of the article, the type of community, or the content of blog. However, there were cases where it was difficult to classify a blog with these three characteristics. For example, a student blogger would share their diary, their comments toward a specific hyperlink, or what they learn in the school. It's difficult to classify this student blog as k-log, personal diary, or filter blog. Therefore, it's a new issue to classify adolescents' blogs into different groups with automatic computer algorithm, and based on their respective distinctive characteristics, we gathered information from their blogs. However, few empirical studies have been carried out with respect to adolescent blogs for the purpose of classifying their blogs into groups according to blog genre (type of article) and even investigate the language use (networking writing styles).

## RESEARCH METHOD

### Participant

The participants of this study were adolescent bloggers between 12 and 18 years of age who were enrolled in either a junior or a senior high school. Initially, the seed blog of an adolescent was randomly selected from the blog service provider Wretch. Snowball sampling was used to randomly select two to three blogs that appeared as links on the originally selected blogs. The search was ended when there was no further hyperlink network could be tracked (Liu, Shih, & Tsai, 2011).

Finally, the chosen adolescent bloggers were required to meet the following criteria: the bloggers must be adolescent (between 12 and 18 years of age), they must have 50 or more articles posted on their blogs, and each article should contain around 300 words. The blog data were collected within three weeks to avoid the rapid change of the selected blogs. When a blogger posted an article within these three weeks, the research assistant must add the information into the database for further analyses. A total of 48 blogs hosted by 24 male and 24 female adolescent bloggers were sampled (30 senior (62.5%) and 18 junior (37.5%) high students). There were 696 articles randomly selected for content analysis from the 48 blogs.

### Procedure

Content analysis was used to identify the blog genre and language use of the sample articles. Through content analysis, 11 blog genres were obtained (Table 1), and 8 types of language use were found, e.g. phonetic symbols, homophones, Taiwanese dialect, letters, pictogram, digit symbols, text-based emoticon, and figure-based emoticon. The following analysis would use factor analysis to reduce the 11 blog genres and 8 types of language use to fewer factors, and use the factor score of those factors as the input of k-means clustering to find the type of blog automatically. The descriptive statistics was used to describe the basic characteristics of selected blogs. The MANOVA was used to compare the basic characteristics of different types of blogs.

Table 1: Classification and description of the blog genre

Category	Description
Feelings	Focuses life events; emotional expression; attitudes toward some events
Love	Focuses on love (the same gender or the opposite gender), including describing love stories, which may also involve recounting quarrels and amorous events.
Peer	Focuses on the description or record of friendships or arguments between friends.
Fans	Focuses on celebrities, including monitoring entertainment news, opinions on film stars (movies or albums). If the content of the article is simply copied from other places, the article is then categorized in the "paste" category, not in the "fans."
Interest	Focuses on the particular interests of the bloggers.
Call the roll	Focuses on this new popular game on the Internet. It is similar to a questionnaire, and urges bloggers or visitors to answer questions.
School	Focuses on the events taking place in school in addition to school life and examination related topics.
Creation	Focuses on the creative work of the blogger including music, texts, pictures, and photos, etc.
Sports	Focuses on field sports including feedback on sports events, and emotional responses regarding participation in sports clubs. If the content of the article is simply copied and pasted from other places, the article is categorized in the "copy and paste" category, not in the "fans."
Copy and paste	Articles were not originally written by the blogger, but originated from Internet, books, or other sources, and no adjustment was made to the original content.
Leisure	Focuses on leisure and entertainment including travel and play.

### Data Analysis

Factor analysis was employed to analyze the types of articles and the language used in the blogs so as to explore the factors that influenced the subject matter in the blogs. According to the content analysis, there were approximately 19 “languages” used in the blogs, including the Na’vi language, phonetic symbols, homophones, Taiwanese dialect, pictograms, digit symbols, and symbols of emotions, such as text-based and figure-based emoticons. Table 2 shows the results of the factor analysis. Four factors were extracted. Factor 1: love, peers, and figure-based emoticons; Factor 2: letters, feelings, and Taiwanese; Factor 3: digit symbols, fans, and homophones; and Factor 4: sports, phonetic symbols, interest, and school. Each factor consisted of specific types of articles and Internet languages used in the blog. Thus, the researchers named the factors according to the article type. Factor 1 was named peer relationships; Factor 2 was named expression of feelings; Factor 3 was named fans; and Factor 4 was named entertainment and school.

Table 2: Factor loadings and eigen values for each factor

Items	Peer relationships	Expression of feelings	Fans	Entertainment and school
Love	<b>.88</b>	-.01	-.10	.00
Peer	<b>.77</b>	.26	.03	.25
Figure-based emoticon	<b>.69</b>	.11	.38	.05
Letters	-.06	<b>.85</b>	.14	.12
Taiwanese	.28	<b>.72</b>	.09	.07
Feelings	.12	<b>.71</b>	-.18	.24
Digit symbols	-.01	-.01	<b>.86</b>	-.08
Fans	.23	-.12	<b>.73</b>	-.03
Homophones	-.12	.41	<b>.71</b>	.13
Sports	-.27	-.04	-.06	<b>.75</b>
Phonetic symbols	.23	.16	.03	<b>.73</b>
Interest	.10	.10	-.04	<b>.63</b>
School	.17	.29	.09	<b>.56</b>
Eigen value	2.18	2.13	1.99	1.97
Cumulative percentage of variance	16.75	33.16	48.46	63.59
KMO sampling adequacy coefficient	.53***			
*** p < .001				

### FINDINGS

#### Descriptive Statistics of the Adolescent Blogs

In this study, only the blogs with at least 50 posts were selected. It was found that 37.5 % of the blogs posted consisted of 101 to 150 articles and 29.2% consisted of 50 to 100 articles (Table 3). In total, there were 6912 articles posted by the bloggers, with an average of 114 articles per adolescent. Male bloggers posted an average of 117 articles, whereas females posted 171 articles. The articles written by male adolescent bloggers contained 349 words on average, whereas those written by females contained an average of 313 words. During the period of the study, male adolescent bloggers were actively engaged in their blogs for 21 months on average, whereas the operation period for female adolescent bloggers was 17 months.

Table 3: The total number of articles in the adolescent blogs

Total number of articles	Number of blogs	Percentage
50~100	14	29.2
101~150	18	37.5
151~200	7	14.6
201~250	4	8.3
251~300	3	6.2
301~	2	4.2
Total	48	100

With respect to article type (or blog genre), the results indicate that the topics were extremely diverse but focused primarily on feeling type and school type articles (Table 4). This may be because the adolescents' lives were primarily centered on their friends, schooling, and family. As a result, the events posted on the blogs tended to reflect such concerns. Further analysis on the content found that there was an emphasis on study pressure, peer interaction, love, and interactions or conflicts with their parents.

Table 4: Descriptive statistics of blog genres on the adolescent blogs

Type	#	%
Feelings	256	32.6
School	187	23.8
Peer	107	13.6
Love	79	10.1
Leisure	55	7.0
Copy and paste	46	5.8
Call the roll	20	2.5
Sports	16	2.0
Fans	10	1.3
Creation	7	0.9
Interest	3	0.4
Total	786	100

Due to an extensive immersion in networking, the new generation of adolescents has gradually resorted to a style of writing and language commonly found on the Internet or in blogs, for example, the Na'vi language. The Na'vi language differs substantially from everyday language in that the Na'vi language is creative and novel, thus allowing adolescents to demonstrate their uniqueness by using this language. As a result, the Na'vi language has gradually become a new form of sub-culture for adolescents.

According to the findings of this study, the Internet language most used by adolescents is the formal language used in their academics and personal lives. To appear endearing, the adolescents occasionally employ a form of Na'vi (Table 5). Table 5 shows that the adolescents' blogs used phonetic symbols (e.g., 丿 means "no" in Chinese) the most and digital symbols (e.g., 5201314 means "I love you forever" in Chinese) the least. The possible reason why the phonetic symbols were used in blogs may be that adolescents prefer to chat or communicate as if involved in an online game. To save time, they preferred to use Chinese phonetic symbols to express ideas. When this misuse becomes a popular means of communication (Na'vi language), a subculture

is created. Thus, the Na'vi language and the Internet language used in the blogs are considered interchangeable.

Table 5: Descriptive statistics of the Na'vi language used in the adolescents' blogs

Forms of Na'vi language	#	%
Phonetic symbols	191	40.6
Homophones	141	30.0
Taiwanese dialect	88	18.7
Letters	37	7.9
Pictogram	10	2.1
Digit symbols	3	0.7
Total	470	100

The emoticon can be classified into a text-based emoticon (e.g., ^ . ^ means smile or happy) or a figure-based emoticon (e.g., 😊 also means smile or happy). The emoticon also represents a form of the Na'vi language (adolescent language used in a blog). The adolescent employs an emoticon for the purpose of expressing emotion and friendliness so as to create a closer relationship between the adolescent blogger and the readers. In analyzing the content of the blogs, we found that adolescents used text-based emoticons most often when engaged in blogging. A possible reason for using text-based emoticons is that they provide a short-hand way to express ideas, thus saving time.

Table 6: Descriptive statistics of emoticons used by the adolescents

Emoticon	#	%
Text-based emoticon	415	93.3
Figure-based emoticon	30	6.7
Total	445	100

### Clustering Analysis of the Adolescent Blogs

The present study employed the K-means grouping method for the cluster analysis, in which the input data represented the factor scores that resulted from the factor analysis. By using the high and low values from the four factors identified above, sixteen possibilities were generated for each factor. Therefore, group sizes of two, three, four, and five were considered appropriate for the purpose of the cluster analysis. We found that when the sample was divided into three, four, or five groups, there were too many blogs in some of the groups; therefore, these categories were deemed inadequate for the purpose of explaining the sample characteristics. The best option was to classify the samples into two groups for further analysis. The group results are summarized in Tables 7 and 8.

The factor scores were standardized with the values ranging between -3 and 3. A scale for the factor scores was produced by dividing the factors into 11 equal parts. After converting the scores to the scale, the scale was then used to describe the characteristics for each group. Groups were, thereby, named according to their characteristics. Employing cluster analysis, the samples were divided into two groups, a topic balanced group and expression of feelings group. The topic balanced group (Group 1) consisted of 35 adolescent blogs (16 female bloggers and 19 male bloggers). This group is characterized by a scale of five with regard to peer relationships, fans, and entertainment and school (Table 7) and four points with respect to expression of feelings. In particular, the performance of this group is average, and the four ranking factors are moderate.

Table 7: Topic balanced group score scale table

Factor	Factor score	Scale
Peer relationships	-.25	5
Expression of feelings	-.42	4
Fans	.10	5
Entertainment and school	.03	5

The expression of feelings group (Group 2) received seven points for expression of feelings, six points for peer relationships, five points for fans, and five points for entertainment and school. Both expression of feelings and peer relationships obtained relatively high scores (Table 8). Thirteen adolescent blogs (eight female bloggers and five male bloggers) were also included in this group. With regard to the content analysis, the types of articles in such a blog focused on feelings, love, and peer relationships. Through reading the articles of this group, it was relatively easy to determine whether the adolescent blogger was happy or worried, the blogger’s likes and dislikes, and whether the adolescent blogger was involved in interpersonal relationships that gave rise to any problems or concerns.

Table 8: Expression of feelings group score scale table

Factor	Factor score	Scale
Peer relationships	.69	6
Expression of feelings	1.14	7
Fans	-.27	5
Entertainment and school	-.09	5

### Differences between the Two Groups in the Adolescent Blogs

Multivariate analysis of variance was used to test the differences between Groups 1 and 2 on the number of articles, the number of words, and the duration of blogging. The results indicate there was a significant difference between Groups 1 and 2 (Wilks’  $\Lambda = .68, p < .001$ ) with respect to the three dependent variables. The post hoc comparison indicates that there was also a significant difference in the number of articles ( $p < .001$ ). However, there was no significant difference between the two groups with respect to the number of words or duration of blogging (Table 9).

Table 9: Summary of the post-hoc comparison with number of articles, number of words, and the duration of blogging for the two groups

Dependent variable	Group	Mean difference	Standard error	95% Lower bound	95% Upper bound
Number of articles	G1 – G2	-92.75***	20.04	-133.09	-52.41
	G2 – G1	92.75***	20.04	52.41	133.09
Number of words	G1 – G2	15.23	37.17	-59.59	90.05
	G2 – G1	-15.23	37.17	-90.05	59.59
Duration of blogging	G1 – G2	1.33	2.43	-3.55	6.22
	G2 – G1	-1.33	2.43	-6.22	3.55

\*\*\* $p < .001$

Multivariate analysis of variance was used to test the difference between Groups 1 and 2 in relation to the eleven blog genre posted by the bloggers. The results indicate there was a significant difference between Groups 1 and 2 (Wilks’  $\Lambda = .37, p < .001$ ) with respect to the eleven dependent variables. The post hoc comparison indicates there were significant differences with regard to the four types of articles ( $p < .05$ ): feelings, love, peer, and copy and paste. However, there was no significant difference between the two groups with respect to the other types of articles (Table 10).

Multivariate analysis of variance was used to test the differences between Groups 1 and 2 in relation to the Internet language used in the blogs. The results show that there was a significant difference between Groups 1 and 2 (Wilks'  $\Lambda = .37$ ,  $p < .001$ ) with regard to the eight dependent variables. The post hoc comparison also indicates that there was significant difference with regard to the three types of Internet language used in the blogs ( $p < .001$ ), letters, Taiwanese, and text-based emoticon. There was no significant difference between the two groups with respect to the other types of Internet language used in the blogs (Table 11).

Table 10: Summary of the post-hoc comparison for the eleven types of articles in the blogs

Dependent variable	Group	Mean difference	Standard error	95% Lower bound	95% Upper bound
Feelings	G1 – G2	-4.19*	.87	-5.94	-2.43
	G2 – G1	4.19*	.87	2.43	5.94
Love	G1 – G2	-2.20*	.70	-3.62	-.79
	G2 – G1	2.20*	.70	.79	3.62
Peer	G1 – G2	-3.17*	.77	-4.71	-1.63
	G2 – G1	3.17*	.77	1.63	4.71
Fans	G1 – G2	.08	.19	-.31	.46
	G2 – G1	-.08	.19	-.46	.31
Interest	G1 – G2	-.02	.08	-.18	.14
	G2 – G1	.02	.08	-.14	.18
Call the roll	G1 – G2	.02	.21	-.41	.44
	G2 – G1	-.02	.21	-.44	.41
School	G1 – G2	-1.17	.90	-2.99	.65
	G2 – G1	1.17	.90	-.65	2.99
Creation	G1 – G2	.10	.18	-.27	.45
	G2 – G1	-.10	.18	-.45	.27
Sports	G1 – G2	.25	.23	-.21	.70
	G2 – G1	-.25	.23	-.70	.21
Copy and paste	G1 – G2	-.80*	.35	-1.49	-.10
	G2 – G1	.80*	.35	.10	1.49
Leisure	G1 – G2	-.12	.45	-1.02	.79
	G2 – G1	.12	.45	-.79	1.02

\* $p < .05$

Table 11: Summary of the post-hoc comparison for the eight types of internet language used in the blogs

Dependent variable	Group	Mean difference	Standard error	95% Lower bound	95% Upper bound
Phonetic symbols	G1 – G2	-2.24	1.48	-5.22	.73
	G2 – G1	2.24	1.48	-.73	5.22
Digit symbols	G1 – G2	.09	.08	-.07	.25
	G2 – G1	-.09	.08	-.25	.07
Letters	G1 – G2	-1.48***	.33	-2.14	-.81
	G2 – G1	1.48***	.33	.81	2.14
Homophones	G1 – G2	-1.25	1.47	-4.20	1.71
	G2 – G1	1.25	1.47	-1.71	4.20
Taiwanese	G1 – G2	-2.76***	.52	-3.81	-1.71
	G2 – G1	2.76***	.52	1.71	3.81
Pictogram	G1 – G2	-.03	.22	-.48	.42
	G2 – G1	.03	.22	-.42	.48
Text-based emoticon	G1 – G2	-7.55***	1.56	-10.69	-4.42
	G2 – G1	7.55***	1.56	4.42	10.69
Figure-based emoticon	G1 – G2	-.94	.64	-2.23	.35
	G2 – G1	.94	.64	-.35	2.23

\*\*\* $p < .001$



## DISCUSSIONS

Adolescents often write various topics on blogs, and most are concerning their daily life and schooling because they are students and their life happens mainly at school and home. Thus, the content of their writings are affected by these two situations. Although they write articles about daily life and schooling, different bloggers focus on different perspectives. With the same topic of the articles, readers may read what happened at school or homework and test results in one blogger's article, while complaint about the teacher's threatening and discontent in the other. Additionally, some teenager bloggers write articles about interests, creativity writing, or sports. Therefore, we suggest that teenagers focus on writing a particular or specific topic in order to improve not only the quantity, but the quality of articles as well, and thus to distinguish the features of their blogs.

In this study, we found four factors, including peer relationship, expression of feelings, fans, and entertainment and school and used them as 4 genres to classify the adolescents' blogs effectively. Thus, the adolescents' blogs were classified into the "topic balanced group" and "expression of feelings group" according to the factor loadings of the four factors. Compared with "topic balanced group", we found the factor loadings are higher in "expression of feelings group" in terms of peer relationship and expression of feelings. That is, the content of the blogs of the expression of feelings group tend to have bloggers' personal expression of feelings involved, which concerns with interactions with peer and the opposite gender instead of just noting down things that happen daily. Furthermore, the statistics confirm that the expression of feelings group have more blog articles related to daily routine, romance, and peers than of the topic balanced group, which confirm the statistical results stated earlier. On the contrary, the topics of the articles vary and balanced and cover personal diary, peer relationship, creative writing, and entertainment. However, the diversity in genre could do negative impact to the quality and the quantity of the articles. Also, for easily managing the multiplicity of a blog, many bloggers would further classify their articles into more specific subtopics.

In general, adolescent bloggers hardly ever use a fixed theme, e.g. gourmet, traveling, or issues on gender, to share their articles. Instead, they always mixed all kinds of themes. Although four factors of adolescent bloggers were obtained and classified into two groups, we found little differentiation between these two groups. This reflects that the adolescents like to present themselves through writing various topics and some confusing net language, which may seem nonsense or meaningless to many of us, but meaningful to the adolescents. Readers from other generation should bear an open mind when reading their articles. In the past, Krishnamurthy (2002) use two dimensions: personal/topic and individual/community blogs to analyze the articles posted in teenagers' blogs, and four types of blogs were found. However, what kinds of topics would the teenagers write in the blogs did not stress clearly. This study further analyzed the content of the articles teenagers wrote in their blogs, and eleven kinds of blog were explored. The result indicated that students would share their feelings or daily life events in their blogs. This finding echoed the previous studies indicating that students would express their emotion and feeling through their blogs (Blood, 2002; Herring & Paolillo, 2006; Kalelioglu & Gulbahar, 2010; Kiyici, 2010; Liu & Chang, 2010). Gradually, blog has become a convenient media for teenagers to write some articles to express their emotion in their blogs. The result implied that teenagers' blogs could be viewed as another channel for teachers or parents to monitor or care the teenagers' daily life and emotion.

More interestingly, we found that teenagers did not only share their emotion, or record their daily life in the blogs. Actually, because blogs allow teenagers to use different kinds of materials, such as texts, photos, or videos to show their new ideas, to present their creative work, blogs provide more chance for teenagers to express their creativity in different forms. Additionally, the characteristics that information spread quickly in the internet world provide more opportunity for teenagers' creative works to be seen by others, and this will enhance teenagers' motivation to share and express their different creative ideas in their blogs. Blogs become another channel outside of the classroom for teenagers to express their creativity. We suggested that teachers could apply blogs into classroom to encourage students to express their creativity. However, we further noticed that students would copy and paste others' articles or works in their blogs to share the information. Obviously, teenagers would used blogs to be a channel for exchanging information, and "copy and paste" is a common behavior. Because students have more chance to use online information, internet ethics becomes an important issue. When teachers use blogs as an instructional or learning media, teachers should teach their students how to use this media, and how to use the information online appropriately.

Cyber environment is truly different from the real world. It is not necessary we take the subculture constructed by the Internet that serious. Most of practitioners and educators worry very much about the bad influence of t Na'vi language. They think the language use would lower students' language level. On the other hand, the use of Na'vi language can be treated as students' creativity. Also it may not have consequence between Na'vi

language and student's language competency, which means stopping students from using Na'vi language is no guarantee of good language level. To conclude, an instructor's teaching methods and content may also affect student's language learning, except student himself/ herself. Meanwhile, the findings of the study reveal that only a small amount of students use Na'vi language and some even dislike using it. As long as this language does not do too great impact to children, we should be more tolerant about this phenomenon for adolescents to present themselves. After all, mainstream culture and subculture can coexist in our society. Overtime, some cultures which do not evolve and fit the society may be extinct.

In this study, we analyzed the content of the articles the teenagers posted in their blogs, and explored different types of behaviors shown in the blogs. Blogs were viewed as a new media for adolescents to express their ideas or emotion. Moreover, blogs were a kind of open and interactive environment, and lots of interaction would happen between bloggers and their audiences through feedbacks or comments. In the future, in order to have deeper understanding about adolescents' behaviors in the blogs, it is essential for researchers to analyze the interaction between bloggers and their audiences, and to examine how the interactions between bloggers and their audiences affect adolescents' behaviors in the blogs.

## CONCLUSIONS

The results indicate that adolescent blogs could be categorized into one of two groups based on significant differentiating factors. The two groups are the topic balanced group and the expression of feelings group. The distinguishing characteristics include the number of words, the length of time devoted to blogging, the types of articles, and the types of Internet language used in the blogs. With respect to the types of articles, the blogs relating to the expression of feelings group showed more emotions than the topic balanced group, and the articles dealt more with love and peer relationships. This group also included more copy and paste type articles. With respect to the Internet language used in the blogs, the expression of feelings group's blogs employed more letters, Taiwanese dialect, and text-based emoticon language than the topic balanced group. The mode of expression and manner of blogging in adolescent blogs appears, therefore, to be complex and subject diverse. The present study, however, employed cluster analysis to classify the adolescent blogs into two groups with their own distinctive characteristics.

Through the use of cluster analysis, one can clearly see that the groups of adolescents each possess distinct characteristics. In relation to the topic balanced group, the articles told superficial stories that involved a variety of themes and were all-encompassing, which could lead to the speculation that adolescents in this category were more lively, outgoing, and outspoken than those in the expression of feelings group. It may be assumed that blogs of the topic balanced group were less likely to be emotional, and that the bloggers were more concerned with recording main events in their lives.

The expression of feelings group's blogs were more concerned with peer relationships and emotions than the topic balanced group. The article content indicated that the adolescents appeared more sentimental and attentive than the other group. In this respect, articles focused on peer relationships and the bloggers were concerned with friendship and love. When reading articles posted by this group of adolescents, one can gain current information about the adolescents' social support systems.

Finally, because the adolescents were willing to express their thoughts and share their secrets on the blogs, the adolescents' blogs provided a window for teachers and parents to become more aware of the unusual attitudes and outlooks of the adolescents. Many adolescents, unable to cope with the pressures of the academic work have negative emotion. In fact, the messages posted in the blogs provide a means of monitoring and understanding the experiences of the adolescents as they communicate among themselves. Thus, in case parents or teachers have difficulty in communicating with adolescents, teachers and parents now have the option of browsing the personal blogs of their adolescents to understand their inner thoughts.

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