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"To-do-or-not-to-do dilemma" Online: Blog and Essay Writing Visualizations in a Blended-Format University English Course

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Abstract

This study reports on a one-year-and-a-half longitudinal case study that examined students' behaviors and learning outcomes under an online learning environment by using a blog visualization technique. Information visualization is a new area of study that is currently being developed. However, research that examines this topic in CALL was difficult to find. This study was conducted in a blended-format undergraduate English course for students who are science majors. Throughout the semester, the students wrote blogs and essays in English on Moodle. A blog visualization technique was also implemented. Three methods, namely, pre-/post-writing proficiency tests, text analysis of blogs and essay posts on Moodle, and a post-semester online questionnaire, were used for the analysis. The students consistently exhibited high work performance throughout the semester in terms of blog and essay posts. In addition, the students' average writing proficiency score improved as a class community. However, two groups, the progressed and the regressed, reacted differently to the given learning environment, a phenomenon called "the to-do-or-not-to-do dilemma" in this study. Findings show that a learning environment that visually presents students' work performance can contribute to the high performance of the entire group in an online learning environment. However, countermeasures against demoralization and regression should be implemented.

1 Background

Visualization of the online behaviors of learners is a new research area in language education and online education. Visibility is one component of what Dalsgaard and Paulsen (2009) and others refer to as 'transparency' or the capacity to visualize one's online activities and contributions both individually or in comparison with the contributions of others. Visibility of participants' contributions in text form has been made possible by learning management systems such as Moodle.

Visualization, which allows students to see their participation as an image, can augment and enhance visibility and transparency.

Numerous visualization tools have been reported in specialized journals, such as "Information Visualization." These journals focus on the technical aspects of developing these tools. The most relevant of these concepts for the current study is the concept of *visual text analytics* (Risch, Kao, Poteet, & Wu, 2008), which supports the value of visualization of online writing (chat, blogs, forums, and wikis) to foster online participation and improve course management. Due to space limitations, this study briefly introduces only one visualization tool from each genre (chat, blogs, forums, and wikis) that represents distinctive features of tools and for which we obtained permission to reproduce graphics.

Janssen and his colleagues (Janssen, Erkens, & Kanselaar, 2007a; Janssen, Erkensa, Kanselaara, & Jaspersa, 2007b) developed a "Participation Tool" that visualizes chat interaction. In this tool, the distance between a sphere and the group center indicates the number of messages that a student has sent, and the size of a sphere indicates the average length of these messages (see Fig. 1).

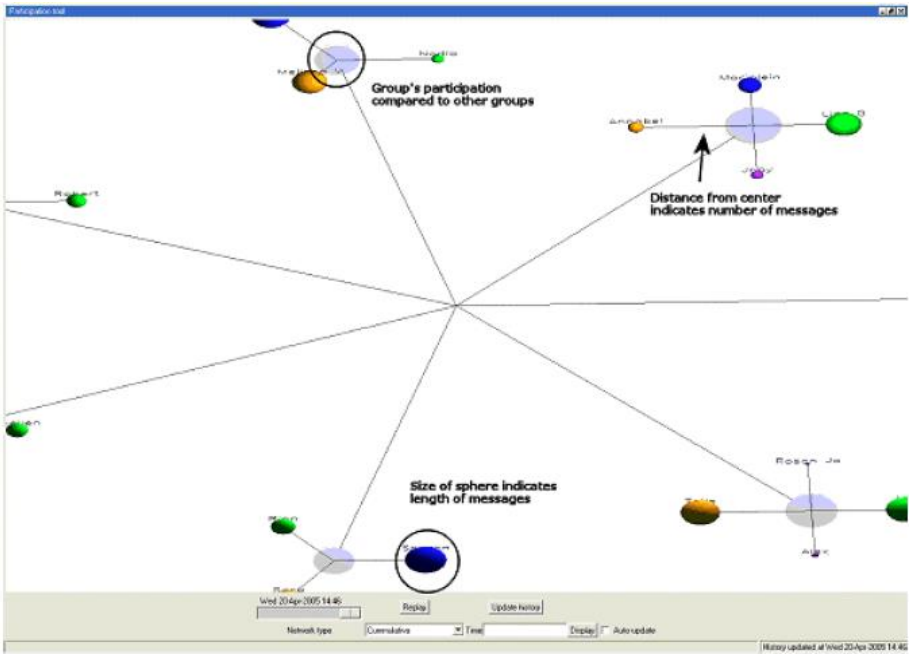


Fig. 1. "Participation Tool" that visualizes chat interaction (Janssen et al., 2007a)

Dawson and his colleagues (Dawson, 2010; Dawson, 2008; Macfadyen & Dawson, 2010; University of Wollongong, 2009) developed a tool to visualize threaded discussions in a network format, in which the red circles in the upper-left corners represent students who are not participating and it is argued that they are at risk of dropping out (see Fig. 2).

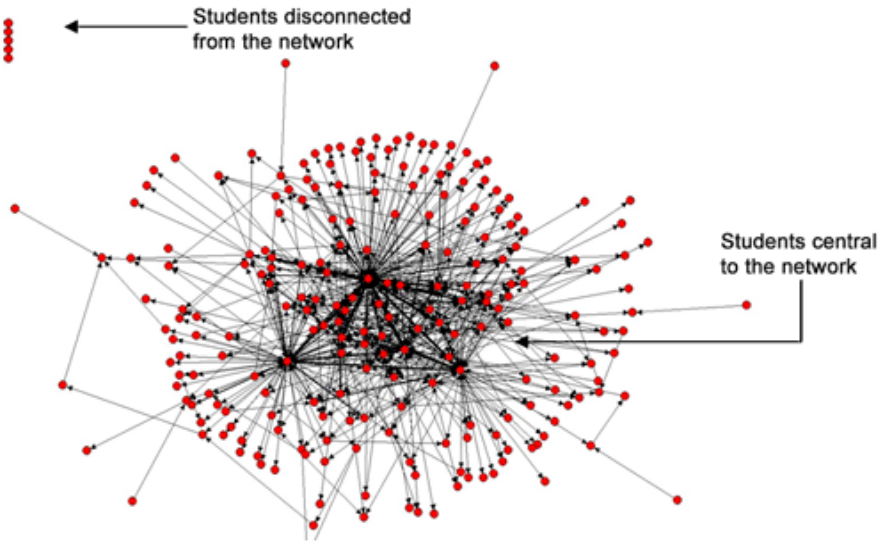


Fig. 2. Participation visualization in threaded conversations using Snapp (Dawson, 2010)

Indratmo and her colleagues (Indratmo, 2010; Indratmo & Vassileva, 2008; Indratmo, Vassileva, & Gutwin, 2008) attempted to develop a blog visualization tool called iBlogVis that represents the current status of blog activity. In this tool, the circles in the lower area represent the number of comments within a topic entry (see Fig. 3).

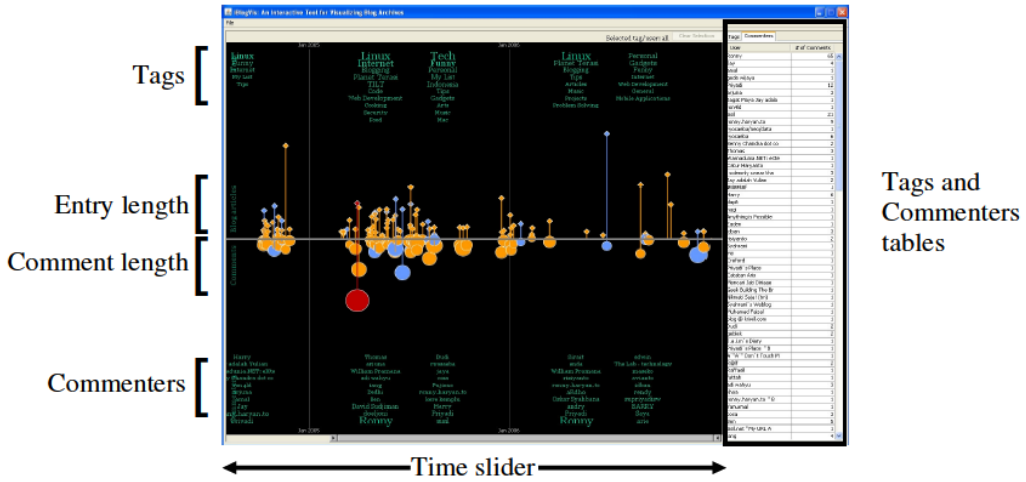


Fig. 3. Visualization of iBlogVis Blog entries, length, comments and tags (Indratmo et al., 2008)

Reimann and Kay (2010) developed a wiki visualization tool called Wattle Tree to develop team skills. Each vertical 'tree' corresponds to a member of a wiki team, and the size of the yellow 'flowers' on the left correspond to the contribution level (see Fig. 4). In all of the examples, larger and denser representations reflect higher levels of interaction and participation within a community.

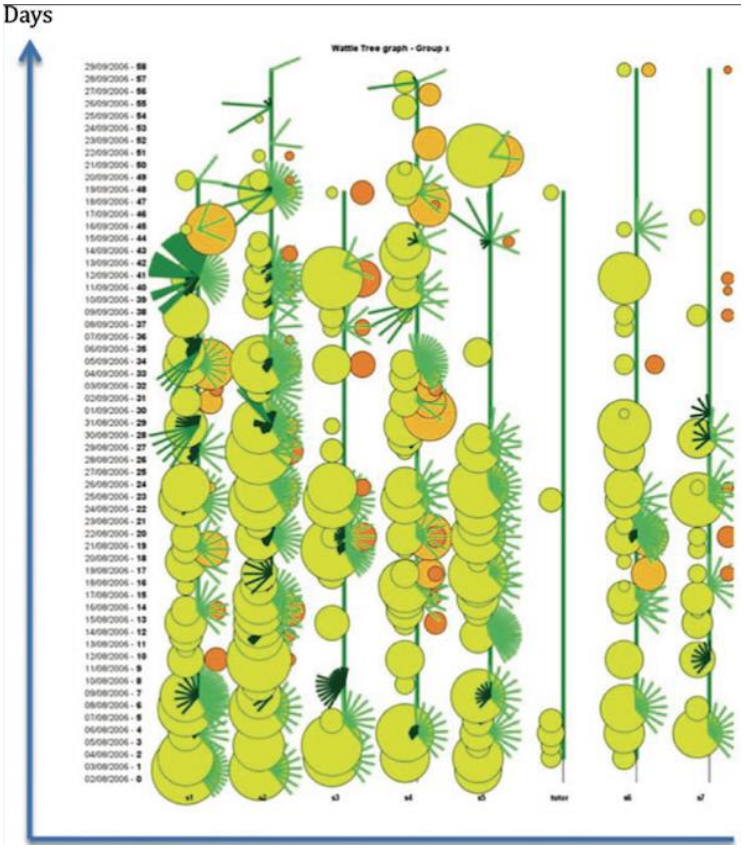


Fig. 4. Wattle tree (Reimann & Kay, 2010)

As visualization of data in real time is a relatively new capacity – or at least newly provided to students – there are little research data on its impact or effect. However, we did search peer-reviewed papers published during the last decade (2001–2012) which focus on computer-assisted language learning (CALL): four papers were identified as addressing digital visualization. Hew and Ohki (2001) examined the effects of animated graphical annotation in Japanese pronunciation acquisition; Levis and Pickering (2004) practiced teaching intonation using speech visualization technology; Lin and Chen (2007) explored the effects of computer-generated visuals in reading comprehension; and Sorapure (2010) provided a concise overview of Web 2.0 visualization tools and their use in writing instruction. The studies conducted by Levis and Pickering (2004) and Sorapure (2010) differ from those by Hew and Ohki (2001) and Lin and Chen (2007) in that the visuals were made using the data produced by the learners as opposed to the teacher or visualizations of learning aids. The use of visuals in the current research is similar to the first two studies.

In addition to developing visualization tools, researchers have attempted to use these tools to explain online behavior. Social psychology and group dynamics theories are often referenced, as they provide useful conceptual grounds for interpreting research results. These theories suggest that the capacity to view oneself in relation to other community members allows learners to assess and adjust their own behavior and participation levels (Kimmerle & Cress, 2009). Dawes and Messick (2000) extended the concept of *social dilemmas* to explain how people use bargaining techniques to manage their gains and losses in online situations. Janssen and his colleagues (Janssen et al., 2007a; Janssen et al., 2007b) relied on the concepts of *social loafing* (to describe those who perform less work within a group than when working alone) and the *free rider effect* (to describe those who receive more than they contribute) to provide a typology of individuals' online

behaviors. To prevent stagnant online participation, Cress and Kimmerle (2007) referenced the concept of *anchoring effects*; an *anchor* is a psychological term that refers to an initial standard that guides people's behavior (Furnhama & Boob, 2011; Tversky & Kahneman, 1974). Their study suggests that the establishment of clear and high standards fosters productive contributions and prevents loss of morale.

Research frameworks that link self-regulation and motivation also provide theoretical rationale for the current study. A study by Chang (2010) on the effects of a web-based self-monitoring system that records a learner's English learning process provides a method of fostering self-regulatory ability and increasing motivation for learning. The basic concept of self-monitoring involves allowing learners to monitor their own work. In many systems, the teacher can also monitor individual students' work as a course manager to gain insight into their work performance, both individually and holistically and, from this information, engage in appropriate teaching practices to assist them.

In this study, student work in the form of blog posts is sharable among all participants (teacher and students) as text and is also visually presented in graphical format (as shown in Figure 2). Visualization was used as a *mirroring tool* (Reimann & Kay, 2010; Soller, Martinez, Jermann, & Muehlenbrock, 2005). That is, the visual information pertaining to a student's work in relation to the work of other class members was expected to increase the students' awareness regarding their own behaviors and those of their classmates, thereby effecting their *locus of control* (Rotter, 1966) according to the level of commitment to the task.

2 Pilot studies

The current research series was patterned as a design-based research study (Anderson, 2005; Anderson & Shattuck, 2012; Brown, 1992; Collins, 1992) that aimed to develop and integrate theory and practice in natural educational settings. According to the Design-Based Research Collective (2003), such a study must focus on the design of learning environments in authentic settings, and development and research must take place through continuous cycles of design, implementation, analysis, and redesign. The methods used must be able to connect the process with the outcomes, and the results should lead to sharable design principles or theories. This study aims to fulfill these criteria as much as possible.

To add the visual representation element, a blog viewing tool known as PISION was developed by a colleague (Sato & Kageto, 2010; Sato, Kageto, Watanabe, Saito, & Nakamichi, 2009) and used in the current study. At the time when the study was conducted, PISION was the only available tool in the country that can be converted for use within the open source Moodle Learning management system used in this school. In Figure 5, the vertical axis shows the chronology, and each of the black ellipses corresponds to a student identification number. Each small white rectangle in the large blue rectangle corresponds to a blog post written by a student. Using the text magnifier (in the lower tool bar) and the gun-sight (on the lower right), the students can locate a specific blog post and read the text. This tool allowed easy retrieval and viewing of blogs by the owner and easy comparison of the quantity of postings among class members.

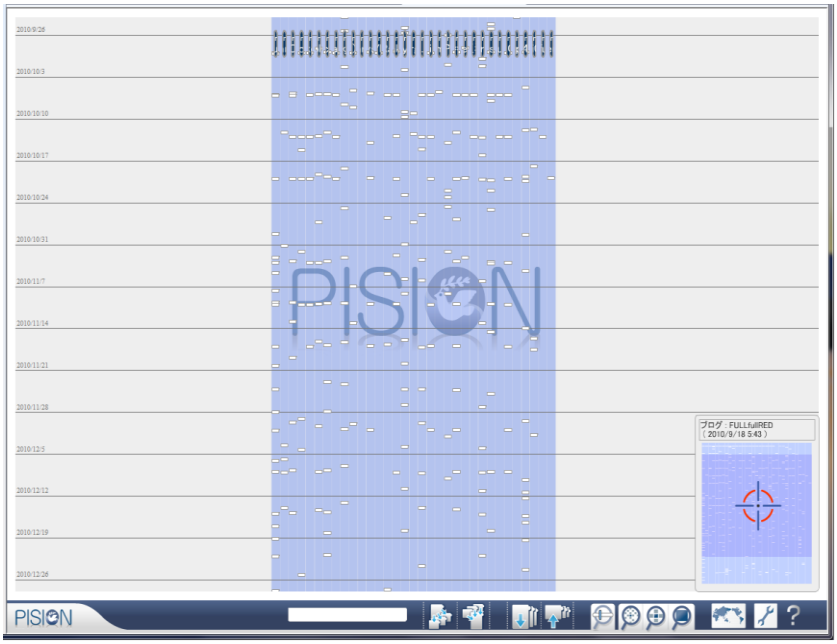


Fig. 5. View of Pision Blog Visualization Tool

Pilot 1 study was conducted in the fall semester with two classes containing students with different English abilities. The abilities of one class group (Class A) were observed to exceed those of the other class group (Class B). These students were classified based on the pre-course placement test. Visualization was implemented in the middle of the semester. Pilot 2 study was conducted with one class group (Class C) of students with similar English abilities (at the same level as the higher-level class in Pilot 1, as classified by the pre-course placement test) in the engineering department. Visualization was implemented at the beginning of the semester. Pre- and post-course writing proficiency tests and a post-course online questionnaire were administered in Pilot 2 to examine learning outcomes and students' reactions.

Figures 6 and 7 summarize the main findings. The peak in postings at the beginning of each semester reflects the use of a guided session to demonstrate and provide practice in the use of the visualization tool. In Pilot 1, during the first half of the semester without the tool, the number of posts decreased each week. However, after the tool was implemented in the middle of the semester, the total number of posts per week began to increase and remained at a moderately high level until the end of the semester (Miyazoe & Anderson, 2011). In Pilot 2, in which the tool was implemented at the beginning of the semester, the total number of posts per week remained at a high level throughout the semester. A close analysis revealed traces of social loafing and the free rider effect, which constitute a social "to-do-or-not-to-do dilemma," with regard to participation in the online behaviors of the students. Pre- and post-course writing proficiency tests demonstrated positive, albeit minimal, changes in the students' English writing proficiency. Also, a positive correlation was found among three factors: the use of the viewing tool, blog writing frequency, and learning outcomes (Miyazoe, Anderson, & Sato, 2012).

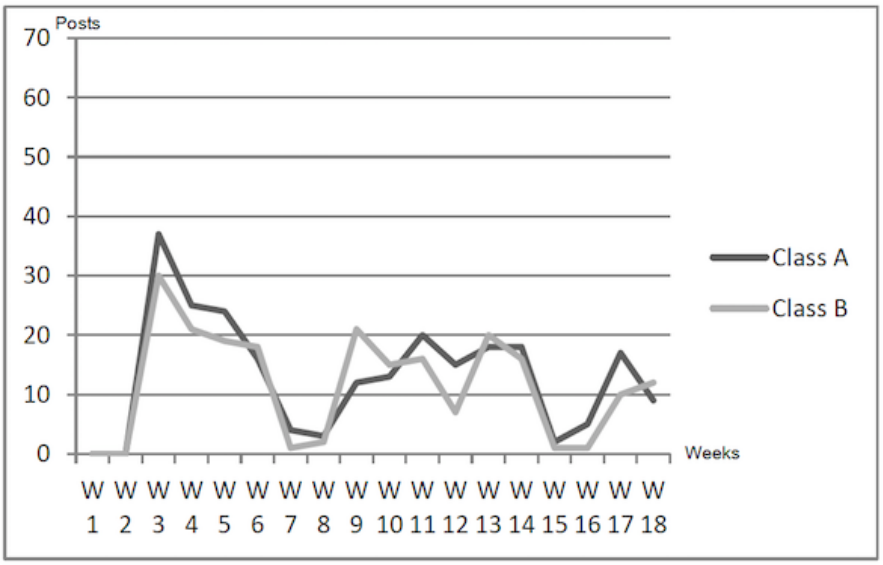


Fig. 6. Blog post frequency in Pilot 1 (no visualization)

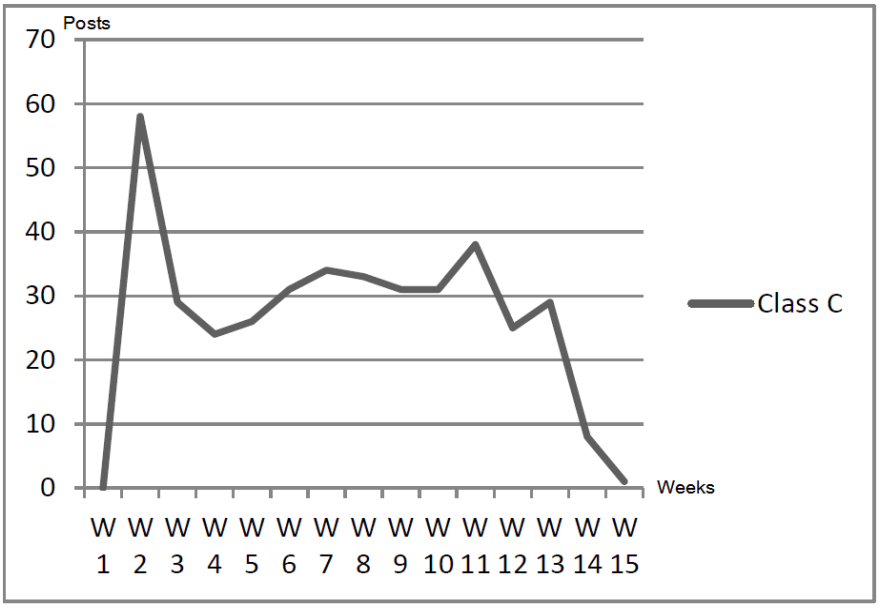


Fig. 7. Blog post frequency in Pilot 2 (with visualization)

3 Research methodology

3.1 Research questions

Based on the findings in Pilots 1 and 2, this study sought to determine 1) whether the online learning environment that makes students' work performance visible promotes consistently high participation, as observed in previous studies, 2) whether this online learning environment produc-

es positive learning outcomes, and 3) what group mechanism can contribute to increases in learning outcomes.

3.2 Participants

All of the students in this research were enrolled in the evening program in the engineering department of a private Japanese university. Four-fifths of these students were also participants in Pilot 2, facilitating a one-year longitudinal analysis. The online writing data for 28 students, including five students who joined the class in the fall, were included, with the students' written consent, for the analysis and possible publication of the results. The online questionnaire, in which student participation was optional, was completed by 27 students (96%).

3.3 Methods

A mixed method using both quantitative and qualitative approaches was used allowing triangulation to provide multiple lenses for gathering and analyzing data (Creswell, 2003; Creswell & Plano Clark, 2007). Three data sources were gathered and analyzed in this study: 1) pre- and post-course writing proficiency tests; 2) an online questionnaire; and 3) blog postings that were stored in Moodle.

The pre- and post-course English writing tests simulated the opinion essay writing section in the Test of English for International Communication (TOEIC; Educational Testing Service [ETS], 2011). The tests were prepared and administered on Moodle with a 30-minute time limit. In Pilot 2, the same essay topics were repeated without prior notice to minimize the effects of differences with regard to the difficulty of the essay topics, which may influence the research results. To verify the reproducibility of the positive change in English writing proficiency under different research conditions in which the majority of students from Pilot 2 also participated, we tested with similar levels of essay topics, which differed from those in Pilot 2 (see Appendix 1).

The same analysis procedures as in Pilot 2 were retained for comparability. All of the writings were copied from Moodle onto paper-based scoring sheets. All of the original layout and linguistic errors were maintained, and randomized identification numbers were assigned. The test papers were then evaluated following the rating rubrics provided by ETS (Trew, 2010) with scores ranging from 0 to 5 points. Two teachers who were native English speakers worked independently as essay assessors; they were not informed of the existence of the co-rater or the order of the essay topics. For research purposes, these teachers were asked to provide ratings using 0.5 intervals to increase the accuracy of the results. The scoring rubrics for the TOEIC opinion essay are identical to those used in the opinion writing in the Test of English as a Foreign Language (TOEFL) offered by the ETS (2008). The two raters were asked to complete the rating process within one or two consecutive days to ensure internal consistency and increase the reliability of their ratings. The same raters were used for Pilot 2 and this research.

The questionnaire included an item regarding the frequency of the use of the blog viewing tool to determine whether the use of this tool became part of their learning strategies. The questionnaire was administered in an anonymous format to ensure a high response rate.

The automatic word count function of a word processing software was used in the text analysis of blog posts on Moodle. A more accurate word count was obtained when erroneous spacing between words (for example, "todayis" as "today is") was fixed. The validity of treating the word counts of posts and writings as indicators of progress is derived from the research tradition in writing (Wolfe-Quintero, Inagaki, & Kim, 1998). In addition to content, structure and mechanics, the length of an essay is one measurement that correlates with the quality of a piece of writing (Lonka & Mikkonen, 1989).

3.4 Course design

For comparative purposes, the course design and research conditions were the same as those in Pilots 1 and 2, including the blog visualization technique, pseudonym use, and the recommendation (without penalty for not posting) to write at least one blog post per week.

In the two previous studies as well as our study, the course objectives were to improve basic English for science and technical purposes as necessary for engineering. In terms of curriculum requirements, four types of skills (i.e. reading, listening, speaking, and writing) were covered and thus only one-fourth of the course design could be devoted to writing. The courses were designed in a blended-format with both weekly face-to-face meetings and out-of-class online writing activities. Other components of the online portion including course readings, gradebook, and so forth, was developed in Moodle. The students used pseudonyms in this system to reduce the possible effects of existing social relationships in the face-to-face mode portion of the course (Miyazoe & Anderson, 2011).

In the current study, in addition to the blog writing assignments, five opinion essays (approximately one essay every two weeks) were required as part of the one-year course design. This assignment was accompanied by a guidance session on the structure of academic writing before the due date for the second essay assignment – this became the appropriately challenging "anchor" that was expected as the final outcome for the essay assignments.

4 Results

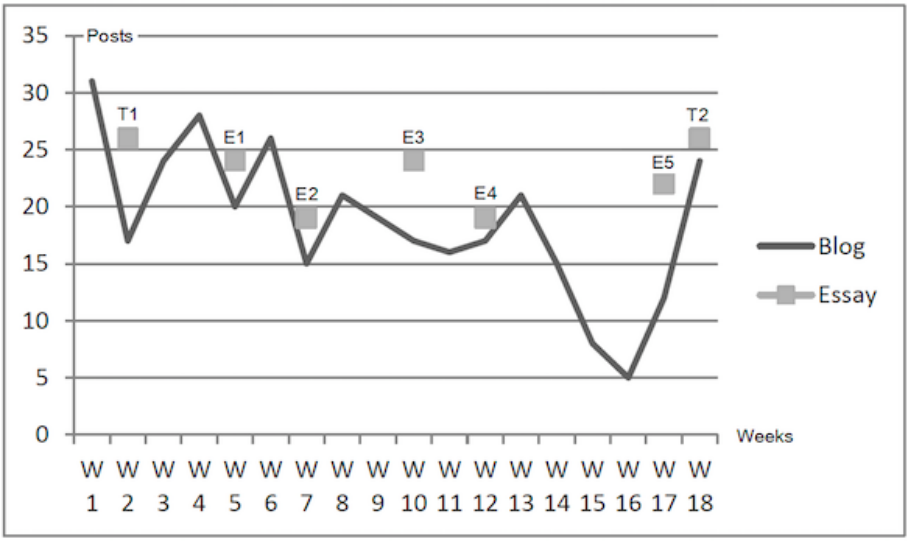
4.1 Online participation

In this research, the participation of the students was reflected by their online posting frequency. Figure 8 summarizes the total number of blog posts per week and the number of essays during the semester. Blog and essay data are juxtaposed to highlight the possible interrelations in terms of workload.

The average number of blog posts per student was 11.5 (N = 28, SD = 6.95), which is nearly the same as the 11.03 posts (N = 31, SD = 4.24) that was obtained in Pilot 2. Therefore, the students' work patterns generally remained consistent in Pilot 2 and in this study.

The sudden decline in blog posts in Weeks 15 and 16 corresponds to the Christmas break, and the decline in Week 7 corresponds to the school festival break. The school event calendar was the same as that shown in Figure 6, and the experiment was conducted during the same season. Therefore, these declines are considered natural consequences of the breaks in the school calendar. Overall, there was a continuously high participation of the students throughout the course.

The combined observation of blog and essay posts facilitates further observations. Compared with Figure 7 for Pilot 2, the current research level appears slightly lower (approximately 20 posts per week from Week 3 to Week 13) during the core period of the semester (compared with approximately 30 posts in Pilot 2). The seven dots represent the total number of posted essays that were due on the class meeting for each day of the week. The first dot in Week 2 and the last dot in Week 18 correspond to two writing tests. The five dots between the tests represent the five essay assignments. Notably, the decline in blog posts and essay posts are negatively correlated. That is, when more assignments were given, the frequency of blog posts decreased. Therefore, the slight decline in blog posts in this research may reflect the students' learning strategy for balancing their individual workload between blogs and essays. Overall, the students were able to maintain a similar pace of blog writing throughout the semester in Pilot 2 and throughout one year of this study without getting into an apparent loss of interest in the assignment.



*T – Test; E – Essay assignment

Fig. 8. Total number of posts per week during the semester

4.2 Use of the blog visualization tool

In response to the questionnaire item regarding the frequency of use of the visualization tool, six students answered "almost never," 15 students answered "occasionally," six students answered "sometimes," and no students marked "frequently." In Pilot 2, of the 29 students who provided consent, 17 students were categorized as rare users, two students were categorized as occasional users, and 10 students were categorized as frequent users. A direct comparison is not appropriate because the class composition differs. However, students that participated in this study during the second semester may have used the tool somewhat less frequently than did the students in Pilot 2 in the first semester.

4.3 Learning outcomes

In this research, learning outcomes are regarded as the acquisition of basic academic English writing proficiency as assessed by the teacher/markers. First, the reliability of the co-ratings is examined. Subsequently, the pre- and post-course results over the course of one semester are examined. Finally, the results for the one-year period, focusing on the data of those students who participated in both Pilot 2 and this research, are considered the longitudinal effects of the learning experience.

4.3.1 Reliability of the ratings

Figure 9 shows the relationship between the raw scores of the two raters for the same student's test paper. The co-rater efficiency using Spearman's rho is .541 ($N = 53$, $p < .01$), which is sufficiently high for our research purposes (Pallant, 2010). Rater 1's rating range (that is, the difference between the lowest score and the highest score) is wider than that of Rater 2, and Rater 2 scored consistently lower than Rater 1. Therefore, the average points (Rater 1, $r = .909$, $p < .01$; Rater 2, $r = .826$, $p < .01$) of both raters were considered appropriate. The raters were the same, and few differences were observed between Pilot 2 and this study; therefore, a comparison between the two studies is considered appropriate.

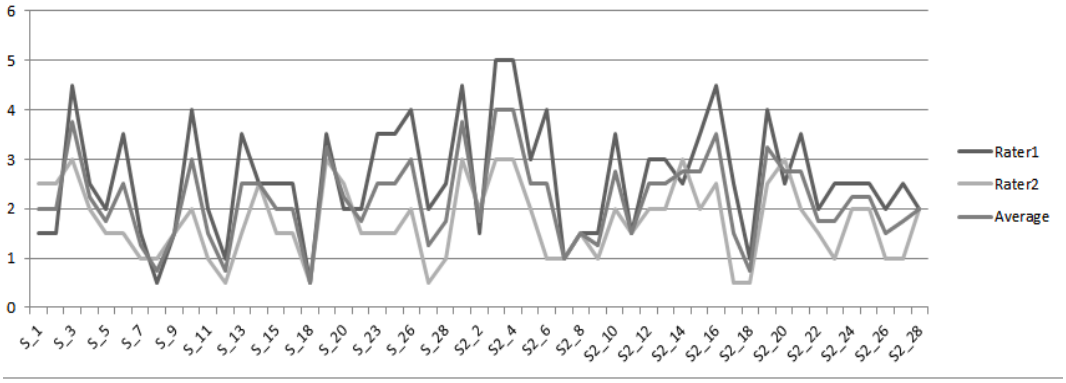


Fig. 9. Score distribution of the two raters

4.3.2 Progress over the course of one semester

Among the 28 students in the course, 25 students completed both the pre- and post-course writing tests (see Table 1). The sample size is smaller than 30; thus, a paired-simple t-test to determine statistical differences is not appropriate. However, it is not unreasonable to assume that the writing proficiency of the students generally increased rather than decreased from the pre-test to the post-test by 0.22 (10.8%) on a 5-point scale during the semester. The results including the test papers of students who took one of the tests (N = 28) are even higher (2.03 for the pre-test and 2.31 for the post-test, or a 0.28-point increase).

Table 1. Change in English writing proficiency over the course of one semester

Test		N	Minimum	Maximum	Mean	Std. Deviation
Pre-Test	Rater1	25	.50	4.50	2.42	1.096
	Rater2	25	.50	3.00	1.64	.729
	Average	25	.50	3.75	2.03	.795
Post-Test	Rater1	25	1.0	5.00	2.70	1.155
	Rater2	25	.50	3.00	1.80	.804
	Average	25	.75	4.00	2.25	.884

4.3.3 Progress over the course of one year

The results of the average scores of the students who took both the pre- and post-tests in Pilot 2 and in this study are summarized in Table 2. The slight decrease from the spring post-test to the fall pre-test (2.05 to 2.03), with a summer break between these semesters, can be explained by the inclusion of five students who had recently joined the class and were new to English writing. However, from the spring pre-test to the fall post-test, the average score for the entire class improved from 1.84 to 2.25 (a 0.41 or 22.3% overall increase). In other words, although only one-fourth of the course was designated for writing, the writing proficiency of the students showed continuous improvement over the one-year period.

Table 2. Change in English writing proficiency over the course of one year

		N	Minimum	Maximum	Mean	Std. Deviation
Spring	Pre-Test	24	.75	3.75	1.84	.758
	Post-Test	24	1.00	3.25	2.05	.547
Fall	Pre-Test	25	.50	3.75	2.03	.795
	Post-Test	25	.75	4.00	2.25	.884

Table 3 summarizes the change in writing proficiency over the course of one year for the 16 students who completed all four tests (and provided consent for analysis). This table reveals the unexpected findings of this research. Among these 16 students, the scores of nine students increased, the score of one student did not change, and the scores of six students decreased. In other words, although the class average appears to have increased by 0.2 points (see Tables 1 and 2), the average score is the result of two groups with opposing tendencies: one group continuously improving (improved group: 1.53 to 2.42), whereas the other group initially demonstrated higher performance in comparison with other students, but was gradually surpassed by other class members (regressed group: 2.50 to 2.00).

Table 3. Score changes of students who took both courses over one year

Change in score	N	Spring		Fall	
		Pre-Test	Post-Test	Pre-Test	Post-Test
Improved	9	1.53	1.94	2.06	2.42
No change	1	1.50	1.50	0.75	1.50
Regressed	6	2.50	2.50	2.42	2.00
Average	16	1.89	2.13	2.11	2.20

The changes in essay length for the two tests and the five assignments for the improved and regressed groups are further analyzed to investigate the reasons for the opposing results. Although increases and decreases are observed, the improved group is characterized by continuous efforts to complete the assignments with gradual increases in essay length. In contrast, the regressed group is characterized by interruptions in the completion of the assignments (Students 12, 14, and 15) and leveling out at the same short length of below 100 words (Students 10, 11, and 14). Given that the students in the regressed group were high scorers at the beginning of the spring semester, the course standards and requirements might not have been sufficiently challenging for these students, especially under the exploratory condition in which they were able to observe the lower performance of other students (compared with their own performance) in text format at the beginning of the course. This situation may have provided these students with less motivation to work more diligently than other students.

4.4 Correlation among factors

The data for 25 students who completed both tests in the fall were further analyzed to identify the factors that were associated with higher learning outcomes. For this process, word counts or the length of posts and essays in relation to the progress or the regression reflected in the writing tests were considered.

Unexpected findings were again observed. A high correlation was found between the change in test scores and the length of Essay 2 (Fig. 10; $r = .675$, $p < .01$). Furthermore, there was a strong correlation between the post-test length and the total length of the blogs and opinion essays that each student produced (Fig. 11: $r = .672$, $p < .01$). In other words, of the five essay assignments,

the length of Essay 2 was the most accurate predictor of the progress that the students would demonstrate in the final test. Moreover, the students who wrote longer blogs and essays produced longer essays with higher scores in the post-test.

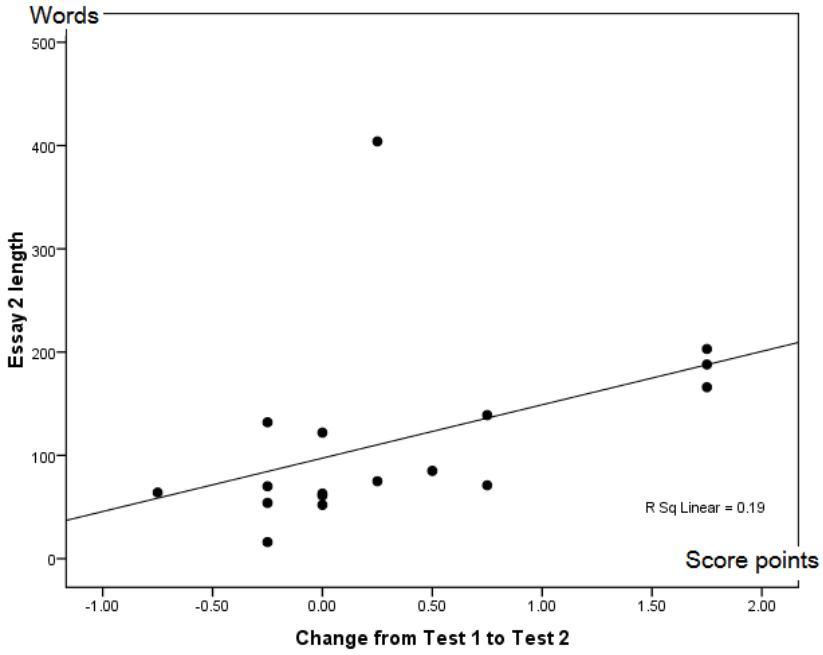


Fig. 10. Post length and change in writing proficiency

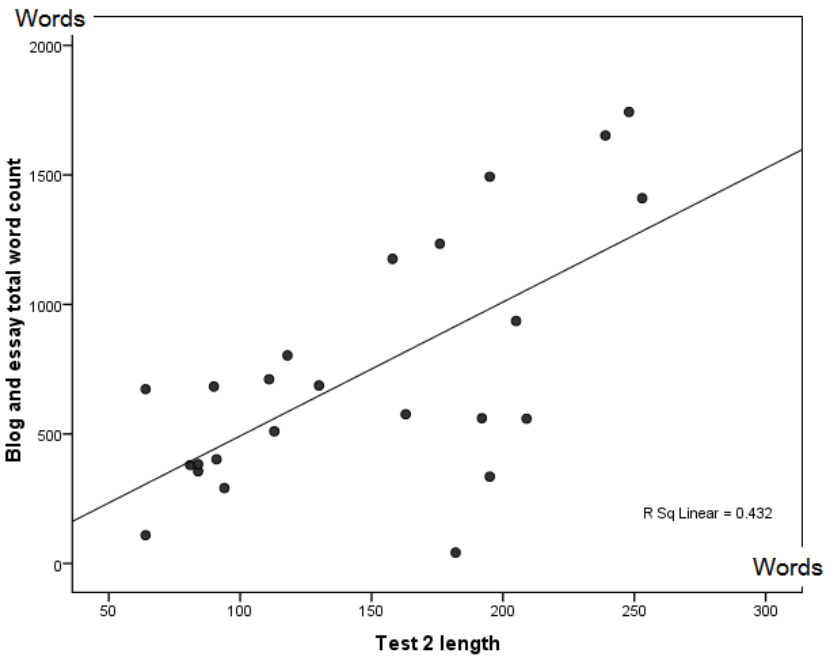


Fig. 11. Post length and test length comparison

Table 4 summarizes the average length of all student essays. Further analysis reveals that the length of Essay 2 was strongly correlated with many other items, such as the length of Essays 3 to 5, the total word count of all essays, total blog length and the average length of blog posts. According to the results in Table 2, the students demonstrated steady progress and internalization of the target language in terms of the change in length from Essay 1 to Essay 5. Furthermore, the accumulation of blog writing reflected the steady progression of learning outcomes over the semester in the post-test, that is, improvements in both content and structure were observed.

Table 4. Growth of essay length during the semester

Event	Pre-Test	Essay 1	Essay 2	Essay 3	Essay 4	Essay 5	Post-Test
Length (words)	120.36	148.32	116.67*	113.26	111.42	139.68	163.27
N	25	24	18	24	19	22	28

*One student's essay that was submitted after the post-test was excluded from this analysis.

5 Discussion

This study found several relevant observations in relation to the research questions. First, the explored online learning environment, which is characterized by high visibility and transparency, was associated with consistently high participation of the students. Second, this online learning environment produced positive learning outcomes both in terms of quality and quantity of student writing. Third, the study found a variety of reactions and learning outcomes in this learning environment.

The students demonstrated adequate progress in the targeted skill over the course of one year. However, the study also found evidence of two diverging directions taken by some of the students: some were motivated to work more diligently, whereas others demonstrated less motivation and worked less diligently. Consequently, the first group demonstrated progress, whereas the second group demonstrated stagnant performance, at least in terms of English writing proficiency. Such a divergent reaction within the learning community was also partially observed in Pilot 1. The authors called this phenomenon as the "to-do-or-not-to-do dilemma," which refers to the moments of indecision that confront students when they are able to visualize the amount of effort they should exert after observing the work of other students and the expected standard (the *anchor*). Many types of online learning promote visibility and transparency as a result of advancements in online communication and collaboration. Visualization allows for an online learning environment that is similar to the learning opportunities available in face-to-face class settings, as students consciously or subconsciously compare themselves and their efforts to that of other classmates..

After one year of studying together in a class community with similar members, the students may have used the viewing tool less frequently than they did in the previous semester. However, the steady participation pattern of the class remained high from the first semester to the second semester. This finding may suggest that one semester was sufficient for the community to form its participatory rules to achieve better outcomes. With respect to the Pilot 2 results, it is not unreasonable to posit that many of the students who "sometimes" used the tool overlapped with the nine students who were conscious of their own work performance, worked more than others, and achieved the highest progress in the current research. The relative infrequency of the use of the tool in the second semester compared with the use in Pilot 2 may also relate to the students' improved ability to track textual blogs (through scroll backs, searching and better navigation capabilities) without using the visual tool, as the teacher had done when no visual tool was available. Regular blogging during the first semester may have had positive effects and ensured that the majority of the class wrote essays regularly during the second semester. For a more decisive conclusion regarding the direct effect of visualization *per se*, additional research should be conducted

with focus on an environment that provides visualization for both blogs and forum essays, if a suitable system is available.

Two findings may be alarming with regard to course design when implementing visualization techniques. The first finding pertains to the six students (Table 3) whose performance showed a slight regression over the one-year period. The provision of the monitoring system may have caused students who initially demonstrated higher performance to subsequently exert less effort – the previously mentioned *social loafing* – in this learning community. However, the nine students who initially demonstrated low performance steadily progressed in overtaking the six students who regressed. If the monitoring system had not been used, these students may not have improved as readily as observed. The second finding pertains to the large effect of Essay 2 on the remainder of the progress and the amount of writing that led to success in the post-test. The guidance session prior to Essay 2 served as the anchor and was conducted to show the students how to approach the assignments. In other words, decisions regarding individual work patterns in the learning community to commit or not commit to the goal may be a critical work performance predictor for the rest of the course. After the individual members of a class community make decisions regarding their working mode, small adjustments to the course design may no longer be useful. It may be necessary for teachers to encourage the self-disciplinary ability of the majority (i.e. more than the half of the class) of the class members at an early stage in the course to ensure that a class chooses to work diligently, which eventually results in positive outcomes (i.e. improvement in the average score) for the class.

By using visualization, a new perspective may be revealed by a comparison of different class behaviors using different leading figures to determine the pace of the work performance of the entire class. For example, groups could be established with zero, three, and five dummy students who work regularly and/or demonstrate higher performance than the initial class level. The inclusion of dummy students is possible with the use of pseudonyms. Because this research design includes "deception" (i.e. not informing participants of the true conditions of the study) in terms of research ethics (Cohen, Manion, & Morrison, 2007, pp. 66–67), the authors of this paper did not attempt such a design.

6 Conclusion

This study found that an online learning environment that uses a visual technique that allows students to compare the quality, length and frequency of their postings with other students can be an effective intervention that is associated with steady and positive work performance. These data obviously can be useful for teachers in monitoring the performance of students and in developing remedial learning activities. However, it also shows the value of sharing visual information on work performance not only with teachers or administrators, but also with students. This visible and transparent environment may enhance learning in an online portion of a course, including the learning strategies and social dilemmas with which a face-to-face mode is associated. This visibility and transparency of learning (both one's own and that of others) is one of the benefits associated with online learning (Dalsgaard & Paulsen, 2009)

Finally, the study points to the need for research that compares different representations of monitoring systems. In this research, a blog viewing tool was used to observe students online behaviors. However, if more precise information such as word count and total number of posts is also presented visually, an even higher level of self-awareness that encourages self-disciplinary abilities may be expected. Alternatively, there may be an optimal level of visibility that encourages the most effective level of participation, beyond which an adverse effect may appear.

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Appendix 1

Directions for Blogging Assignment

Directions: In this part of the test, you will write an essay in response to a question that asks you to state, explain, and support your opinion on an issue. Typically, an effective essay will contain a minimum of 300 words. Your response will be scored on

- whether your opinion is supported with reasons and/or examples

- grammar
- vocabulary, and
- organization

You will have 30 minutes to plan, write, and revise your essay.

Pre-test: What are the advantages and disadvantages of eating at a restaurant rather than at your house? Give reasons and/or examples to support your opinion.

Post-test: When traveling medium distances, some people prefer to fly. Others prefer to take express trains. Which do you prefer? Give reasons and/or examples to support your opinion.

Essay 2: Some think that people will soon get all of their news over the Internet and newspapers will not be needed anymore. Do you agree or disagree? Give reasons and/or examples to support your opinion.

(Trew, 2010)