Student Engagement in Online Learning towards the Development of a Conceptual Framework for Program Evaluation

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ABSTRACT
Students learn because they engage in the process of learning. This article describes how the material design and implementation of an online English program tackles the issues of student behavioural, cognitive and emotional engagements in learning. It also discusses observations made in the review of this program, including those that are about students' performance and feedback, as well as teachers' comments. An analysis of the observations has led to a better understanding of ways to facilitate student learning. The article concludes with a suggested conceptual framework for continual improvement and enhancement of online learning opportunities and experiences—a framework that is anchored to three aspects of learning that emerge in the analysis: learning as a process, learning as a product and learning as an endeavour.

Keywords: online learning, independent learning, student engagement, grammar testing, noticing hypothesis, self-editing, virtual learning environments

1. Introduction

Online learning has become an important way to learn because of its flexibility and convenience, with students learning at their own time and place, resulting in student engagement in online learning being a topic of great interest, for example, studies conducted by Christenson, et al (2013), and Robinson & Hullinger (2008). A growing body of research has also revealed the importance of engagement in the online learning process, pointing to the essential role that student engagement plays (Hu et al. 2016; Everett, D.R. 2015). It is also worth noting that students are eager to engage in online learning and it has been suggested that students '[complete]… exercises on their mobile devices mainly because it was convenient to do so' (Li and Hegelheimer, 2013: 146).

However, although online learning may have become a popular out-of-class activity for many Western students at many Western institutions, Chinese learners may not be as comfortable with this approach to learning because they often 'feel the need for rapid and constant correction and have a low level of tolerance for ambiguity and uncertainty' (Kennedy, 2002: 433). This means that implementing online learning, especially of the independent kind, in a Chinese environment could turn out to be very difficult. Despite this, this paper focuses on an online English learning program for Chinese learners of English with the aim of improving these very skills.

This paper will present a description of the Independent Grammar Study System (IGSS or the Scheme), the participants and materials used, as well as a brief analysis and discussion of student performance, illuminating various aspects of the three dimensions of a conceptual framework that helps with response to issues and concerns about learning as a product, learning as a process, and learning as an endeavour.

2. Literature Review and Context

Raaij and Schepers (2008), who studied Chinese learners and their use of online learning, noted that 'perceived usefulness' of a Virtual Learning Environment (VLE) has a powerful effect on how much Chinese students engage in VLEs. It was therefore important to consider this effect when putting together the Scheme outlined in this paper to ensure engagement from students is as high as possible.
Generally, student engagement refers to the level of student interest in the topic being learnt, students' interaction with input materials, teachers or peers, as well as their motivation to learn. Previous research

abounds with evidence of correlation between student engagement, persistence and achievement in online learning, indicating the importance of encouraging or facilitating student engagement in the online learning environment (Hu et al. 2016; Everett, D.R. 2015; Boston, 2t al. 2010; Wyatt, 2011). Stipek (1996) states that engaged students tend to approach tasks eagerly, embrace challenges, and have a positive outlook on difficulties or problems encountered in their learning pursuit. Student effort, action and persistence in academic work, the emotional states students are in while taking up learning activities (Skinner et al. 1990), as well as time and energy spent as a result of the implementation of educational policies and practices used to encourage student participation in these activities (Kuh 2003) – all this characterizes student academic engagement.

Three dimensions of student engagement—behavioural engagement, cognitive engagement and emotional engagement—have been of interest in many studies (e.g. Sharma & Bhaumik, 2013; Appleton, et al, 2008; Fredricks, Blumenfeld and Paris, 2004). Behavioural engagement is an indicator that shows student attitudes and work effort, such as meeting deadlines, hours spent on activities, etc. Cognitive engagement refers to efforts made in self-regulated learning and students' metacognition such as use of strategy, e.g. reflective practice in the learning process. Emotional engagement can be positive or negative, reflecting students' reactions to the environment, be they people (e.g. teachers and peers) or materials (such as learning input and topic(s) learnt). Since student engagement is critical to learning, these three types of engagement guided the design and implementation of the online program discussed here.

Development of the Scheme is situated within the context of the teaching and learning of English among year-one students in the Division of Science Technology (DST) at the College, which has experienced a pressing need to help students with comprehension of grammar in the English language and to enhance students' reading skills to cope with academic studies.

As the name suggests, IGSS was designed to be an independent learning tool. Because of this, a search for similar papers or projects was started and, soon after, Li and Hegelheimer's 2013 Grammar Clinic project struck a chord with the IGSS design team. Li and Hegelheimer used a mobile based application on which students were required to edit and correct sentences in order to help them improve their ability to correct and edit their own essays. The results from this project show that after using the Grammar Clinic application over the course of a semester, the quality of the participant's essays improved (Li and Hegelheimer, 2013). In addition, the majority of respondents in a post-project questionnaire believed that the 'Grammar Clinic helped them notice errors in their own writing and in reviewing others' papers' (ibid: 147). As students at the College are currently required to self-edit as well as peer-edit drafts of their essays in their mandatory English classes, the results of Li and Hegelheimer's study were promising.

IGSS is a DST project, which is funded by the College, and is designed, developed and implemented by the English Language Centre (ELC) with technical support from DST. ELC, with the help of DST, rolled out the Scheme in the first semester of 2017/2018, as a trial run for the official launch of the Scheme in the following academic year. Data and evidence are available from the trial run for a better understanding of students' learning in the Scheme. The information obtained included students' access to various scheme components (such as quizzes and reading materials), individual students' duration of each quiz session, times and dates of online quiz completion by students, and quiz results. An analysis of such information has led to an emergence of a conceptual framework that provides guidance on how to improve the Scheme's online learning design.

3. An Overview of IGSS Methodology

Conception of the IGSS is borne out of the belief in the important role of enhanced noticing and continual awareness of language features in facilitating the operations of the students' unconsciousness system of linguistic knowledge (Schmidt 1990:149). Language acquisition studies have highlighted the developmental value of repeated noticing and consciousness raising (Schmidt 1990; Schmidt 2010). Consciousness raising in IGSS attempts to enhance students' understanding of grammatical features, vocabulary and syntactical structures to develop students' declarative knowledge. By doing so, it is hoped students will be equipped with an increased awareness of and sensitivity to the English language. The following lists specific details of the design and implementation of an error-detecting approach of the consciousness raising strategy adopted by IGSS. The intended engagement empowerment is put in brackets after each of the corresponding headings.

3.1 The participants

Based on the students' results of the national College English Test for admission to higher education in China, all year-one DST students are placed in a group at one of the six, seven or eight English proficiency levels in their disciplines for classes of a mandatory English course—'English I'. If a student's level is 8/8, s/he is in the lowest ability group of a discipline program that has eight English proficiency levels; 1/8 is the highest ability group of the eight proficiency levels. All year-one DST students are enrolled in the Scheme; their participation is not a university requirement (see Appendix I).

3.2 The learning package

3.2.1 Aim (promoting behavioural, cognitive and emotional engagement)

The Scheme is a college-funded project jointly developed by DST and ELC. It helps students to identify and learn from mistakes commonly made by Chinese students who are learning English as a foreign language. Students can self-assess and improve their language accuracy, practice reading and listening skills.

3.2.2 Grammar Tests

The grammar section adopts a multiple-choice question format with 4 answer options. Distractors are mainly on errors commonly made by students in the linguistic items of the questions. These questions are on twenty-five language categories, including Articles, Prepositions, Verb Tense, Adjectives, Adverbs, Conditionals, etc.

3.2.2.1 Structure (promoting cognitive engagement)

The grammar materials are composed of four sets (A-D) of multiple-choice questions covering twenty-five categories of grammar. Each set is composed of five units, with unit five being a review unit. Eight grammar categories can be found in each set of materials, and students can practice each category in two separate units within the set. Some grammar categories are repeated in more than one unit because they are more commonly seen than other categories in students' errors. A detailed structure is shown in Figure 3A.

Grammar Component	Set	Unit	Categories	Level of Difficulty
	A	1	*Articles; Prepositions; Spelling; Adjectives*	
		2	*Spelling; Adjectives; Punctuation; Adverbs*	
		3	*Punctuation; Adverbs; Conditionals; Gerund*	
		4	*Conditionals; Gerund; Articles; Prepositions*	Easier
		5	*Set A Review*	
	B	1	*Infinitives; Intransitives; Modals; Voice*	
		2	*Modals; Voice; S-V Agreement; Conjunctions*	
		3	*S-V Agreement; Conjunctions; Vocabulary; Tense*	
		4	*Vocabulary; Tense; Infinitives; Intransitives*	↓
		5	*Set B Review*	↓
	C	1	*Prepositions; Articles; Tense; Number*	↓
		2	*Tense; Number; Fragments; Syntax*	↓
		3	*Fragments; Syntax; Spelling; Vocabulary*	
		4	*Spelling; Vocabulary; Prepositions; Articles*	
		5	*Set C Review*	
	D	1	*Logic; Conditionals; Quantifiers; Comma Splices*	
		2	*Quantifiers; Comma Splices; Voice; Causatives*	More difficult
		3	*Voice; Causatives; Abbreviations; Auxiliaries*	
		4	*Abbreviations; Auxiliaries; Logic; Conditionals*	
		5	*Set D Review*	

Figure 3A: List of Grammar Categories in IGSS and their corresponding unit

3.2.2.2 Multiple choice questions (promoting cognitive & emotional engagement)

Quizzes are on language points in each category. For each question, an appropriate amount of information is included in the stem to help bring out correct language usage. Efforts are made to design questions on issues or topics that may pique students' interest or arouse their curiosity. The computer beating human players at a Chinese board game 'Go', great feats of a successful entrepreneur and inventor – Elon Musk, little known but interesting information about Mary Shelley's Frankenstein, and many other fun or newsworthy facts can be found in the questions. Many of the questions were also developed from mistakes commonly seen in students' English course work. All this aims at providing an opportunity for students to learn rules relevant to language accuracy for communicative needs and to use these rules meaningfully.

3.2.2.3 Scoring

All multiple-choice questions are machine scored. Scores awarded to correct answers are linked to attempts made with a maximum of 5 points being awarded to a correct answer given on the first attempt; 3 points for a correct answer on the second attempt; and 1 point for the third. (See Figure 3B.) Scores are recorded in the system. Students cannot proceed to the next unit if the total score obtained in a unit is below 150 points. Multiple attempts are allowed with the purpose of promoting learning and highlighting the importance of learning from mistakes. The system also records the number of attempts made by students in each unit, reflecting the difficulty level of each unit – the more attempts made, the more difficult the unit tends to be (see Figure 3C).

Figure 3B: The start page of the grammar component of the Scheme

Mean No. of Attempts Until Student Passes Each Unit

Set A	Unit 1: 2.87 Unit 2: 3.05 Unit 3: 2.98 Unit 4: 3.00	Set B	Unit 1: 2.77 Unit 2: 2.97 Unit 3: 3.06 Unit 4: 3.09
Set C	Unit 1: 2.57 Unit 2: 3.04 Unit 3: 3.12 Unit 4: 3.14	Set D	Unit 1: 2.40 Unit 2: 3.08 Unit 3: 3.54 Unit 4: 3.58

Figure 3C: Mean number of attempts needed for students to pass each unit of each set

3.2.2.4 Performance summary for students' reference (promoting behavioural, cognitive and emotional engagement)

(a) By the side of each question is information such as time taken, number of attempts made, and total accumulated score. Students can check their own progress and set goals for learning (see Figure 3D.)

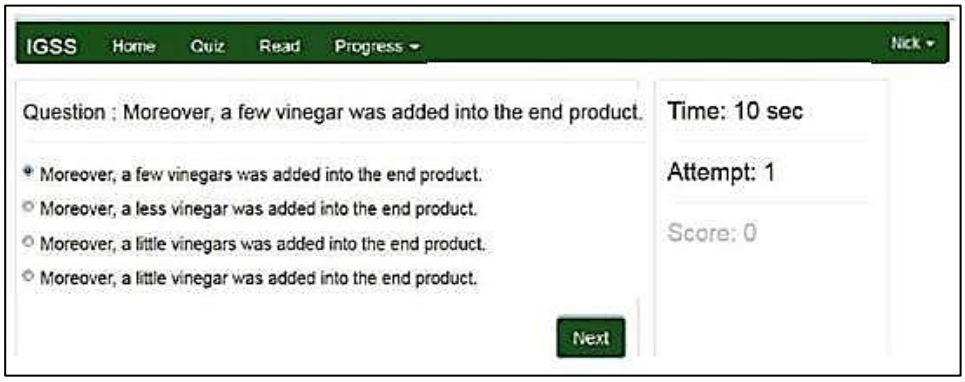


Figure 3D: A sample grammar question as seen during one of the grammar tests

(b) After each question, details of progress and attempts in each unit are shown and recorded in the system (see Figure 3E).

Figure 3E: Results listed for a student after they have completed a grammar test

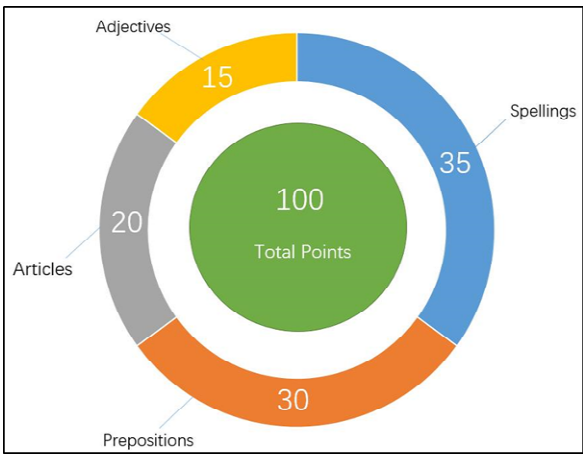


Figure 3F: Donut chart that shows number of points a student received in each grammar category

(c) After each unit, a doughnut chart will appear. The chart will show the score in each grammar category of the unit, indicating the strong and weak areas of the student's grammar (see Figure 3F).

(d) Resource links (promoting behavioural, cognitive and emotional engagement): Students can click on resource links to improve the language skills that have been identified as less than satisfactory, and to further develop their stronger areas. These resource links can help fill gaps in students' knowledge and provide more opportunities for practice; they are also part of reference training for pursuing independent learning. Resource links are provided at the end of each unit on the summary page, adjacent to the doughnut chart. An example of resource link is shown in Figure 3G.

Related Resource Links	
Articles:	http://www.ef.com/english-resources/english-grammar/determiners/
Prepositions:	https://owl.english.purdue.edu/owl/resource/594/01/
Spelling:	https://owl.english.purdue.edu/owl/resource/660/1/
Adjectives:	http://www.ef.com/english-resources/english-grammar/adjectives/

Figure 3G: A sample of resource links listed after every grammar test

(e) Personal timetable (promoting behavioural engagement): To help students record their work progress and manage their work, a personal timetable is incorporated into the Scheme. Students are encouraged to keep track of their work completion throughout the learning process. This personal timetable can also act as a training schedule. The format of a planner or log book is also introduced to students (see Figure 3H).

Student Notice: Weekly IGSS Checklist

Weeks 1 and 2	Workshop	☐	---		---		---
Holiday Week	Set A Unit 1	☐	Set A Unit 2	☐	Read News Article	☐	iSpace Journal ☐
Week 3	Set A, Unit 3	☐	Set A, Unit 4	☐	Read News Article	☐	iSpace Journal ☐
Week 4	Set A, Unit 5	☐	Read News Article	☐	Read News Article	☐	iSpace Journal ☐
Week 5	Set B, Unit 1	☐	Set B, Unit 2	☐	Read News Article	☐	iSpace Journal ☐
Week 6	Set B, Unit 3	☐	Set B, Unit 4	☐	Read News Article	☐	iSpace Journal ☐
Week 7	Set B, Unit 5	☐	Read News Article	☐	Read News Article	☐	iSpace Journal ☐
Week 8	Set C, Unit 1	☐	Set C, Unit 2	☐	Read News Article	☐	iSpace Journal ☐
Week 9	Set C, Unit 3	☐	Set C, Unit 4	☐	Read News Article	☐	iSpace Journal ☐
Week 10	Set C, Unit 5	☐	Read News Article	☐	Read News Article	☐	iSpace Journal ☐
Week 11	Set D, Unit 1	☐	Set D, Unit 2	☐	Read News Article	☐	iSpace Journal ☐
Week 12	Set D, Unit 3	☐	Set D, Unit 4	☐	Set D, Unit 5	☐	iSpace Journal ☐
Week 13	iSpace Survey	☐	Workshop	☐	---		Scan QR Code to access journal

Figure 3H: Weekly schedule given out to all students at the start of the scheme

3.2.3 Reading (promoting cognitive and emotional engagement)

The reading section allows students to read news articles in English in a variety of categories, such as business, technology, sport, etc. It also allows students to listen to the articles while reading. Much thought has been given to providing ease of reading on the screen or monitoring with clutter-free texts and reader-friendly font sizes (see Figure 3I).

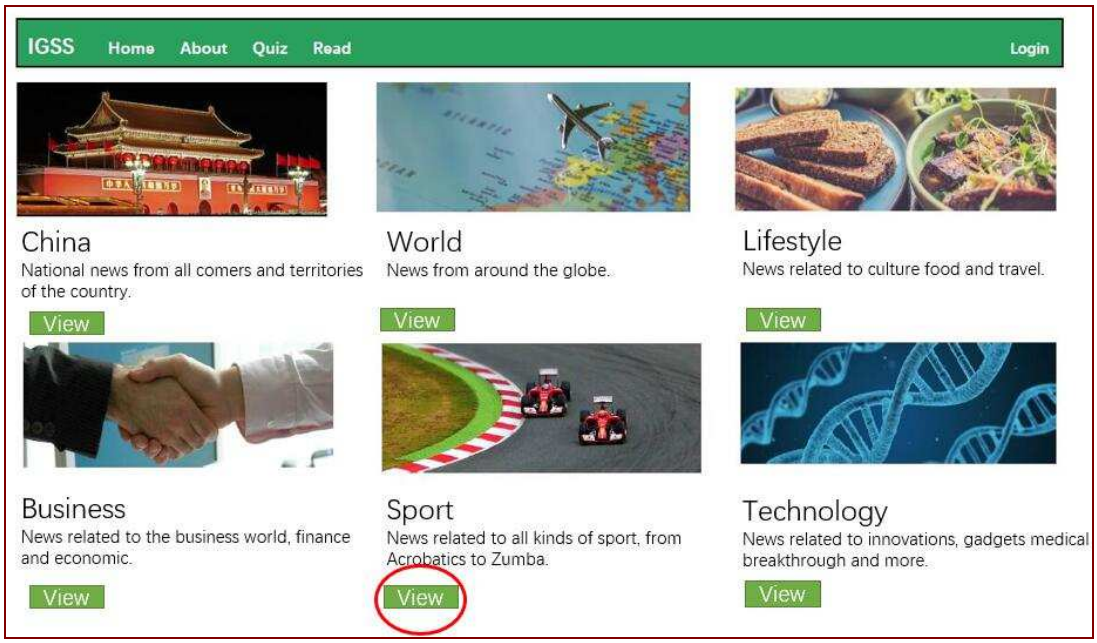


Figure 3I: Page that lists the categories of news available for reading in the Scheme

3.2.3.1 Listening Practice (promoting cognitive engagement)

All articles have been read and recorded by a native speaker and students can listen to an MP3 of these articles. The recording is suitably paced and follows the articles word for word. Students can improve their pronunciation and listening skills through audio reading.

3.2.3.2 Vocabulary building (promoting cognitive engagement)

Top Word Searches in Dictionary

domestic	166	leisure	43
empower	84	generated	42
surpassed	76	incentives	39
increasingly	55	convert	36
separately	50	assault	34
gourmet	44	slot	32

Figure 3J: Most frequently searched words by the end of the Scheme

A built-in dictionary has allowed students to readily check the meaning and pronunciation of new words while reading. The system records the words that students have checked in the dictionary and students can then easily access these words on their own account for revision or reference. Figure 3J is a list of the most frequently searched words in the dictionary:

3.3 Implementation procedures (promoting behavioural engagement)

A schedule of introductory and summative workshops, where pre-scheme and post-scheme grammar tests were conducted, was prepared with the help of administrative staff in both the DST and ELC before the start of the new semester. Announcements of these events were made to students by email. As completion of the

Scheme was on a voluntary basis, a regular check of students' work progress was conducted and reminders were sent to students when needed. During participation in the Scheme, and upon finishing the Scheme, students were asked to complete feedback in the forms of an iSpace journal and a summative questionnaire.

3.3.1 Pre- and Post-Scheme Tests

A twenty-five question grammar test was given to the participants as well as a small control group at the start and end of the semester. The questions were created from the same categories of grammar that are in the Scheme. These tests were set up to compare results of students who used and did not use the Scheme, with the hope that the prior would obtain a higher score at the end of the semester than they did at the beginning.

3.3.2 iSpace Journal and Summative Survey

As the Scheme was a trial run, the IGSS team largely depended on student feedback to gauge the usefulness, convenience of use, and effectiveness of the Scheme. Therefore, students were asked to complete a short journal every week in which they would write any new words they learned and whether they thought they had a better understanding of grammar in that week than in previous weeks. At the end of the semester, a longer questionnaire was given to the students to gauge what they thought of the Scheme overall. Please refer to Appendix V for the questions within the summative survey.

4. Observations and discussions

4.1 Student performance

Unfortunately, during this trial run of the Scheme, no data were collected for the reading and listening components, thus the following section will discuss the results of the grammar-based multiple choice questions. Although the highest points scored by students are in the region of 3,000 out of the maximum of 6,355 points, the results are regarded as satisfactory given the scoring system of the Scheme, with the maximum score being a perfect score for perfect participants who have made no errors in any one single test item out of 1000+ questions. It is fair to say that the maximum score is beyond the reach of year-one students at our institution. The highest score recorded on the trial run of the Scheme was 3,726.

Students who scored the highest points on the Scheme seemed to have taken the Scheme more seriously as they all took part in the post-scheme test. It should be mentioned that Li and Hegelheimer's similar study also noted that more serious participation in the online environment led to higher scores on the post-scheme test (Li and Hegelheimer, 2013: 149). Perhaps IGSS participants were driven by their concern with improvement after working hard on the Scheme or they would like to validate the effort they put in. It is quite likely that these students may have possessed characteristics of successful independent learners—abilities to set goals, sustain self-motivation to achieve the goals, and/or seek ways to measure the progress or improvement made.

Students who scored the highest points on the Scheme are not restricted to any ability or level group. It can be said that the Scheme is of appropriate levels of difficulty or standards. However, the question that needs further investigation is whether the independent nature of the learning approach of the Scheme has any negative impact on weaker students' motivation to learn. After all, as mentioned by Kennedy, Chinese students prefer when 'rules are emphasized' and they are given less autonomy (Kennedy, 2002:432), thus weaker students may struggle with this kind of scheme at first. To find out more about this, a comparison between unsatisfactory results of all students on the Scheme and the final grades of underperformers in the concurrent English course 'English I' will be required to determine if weaker students could be at a disadvantage, plus a more in-depth investigation into some individual underperformers' existing learning strategies.

Generally speaking, the top 10% of the students who scored highest points in the Scheme tend to achieve better grades in the formal English course (English I) that they took at the same time as the Scheme, than those who obtained the lowest 10% of the points scored in the Scheme did. The top 10% scorers on the Scheme have achieved a higher percentage of good grades in the formal English course than the bottom 10% scorers did—21.4% vs 9.6% for 'A' grade; 59.5% vs 47.6% for 'B' grade; 19.1% vs 42.9% for 'C' grade, respectively (see Appendix II). While there is no concrete evidence to suggest a causal link between the performance in a formal English course and the Scheme, the analysis results have hinted at a correlation.

Overall, the Scheme has shown to be effective, though not significantly. Students were asked to do the same quiz with the order of answer options being randomized. The highest, lowest and mean scores of the pre-Scheme test are 22, 3, and 15.34 respectively, while those of the post-Scheme are 25, 5, and 18.07, giving an improvement of about 3 points. The above and below average scorers in the pre- and post-Scheme tests show that a vast majority of the students has shown improvement in the test performance with an increase of as many as 7 or 9 points in the test results (see Appendix III). This also seems to coincide with Li and Hegelheimer's study where the majority of participants also achieved higher scores in the post-test (2013: 144). A review of the pre- and post-Scheme implementation procedures has suggested a need to set up more stringent measures to ensure integrity of the quiz and accuracy of the outcome.

A control group of 20 students in the middle or lower middle proficiency levels in another Division took part in the pre- and post-scheme tests. No noticeable differences were found when comparing results from the two tests administered to the control group, a contrast to the DST students who had generally shown improved scores after completing the Scheme (see Appendix IV). This, in part, has testified to the function of IGSS. Yet the sample size of the control group needs to be re-considered and made larger if results that are more reliable are expected from the comparison.

4.2 End-of-scheme student comments, ELC and DST remarks and suggestions

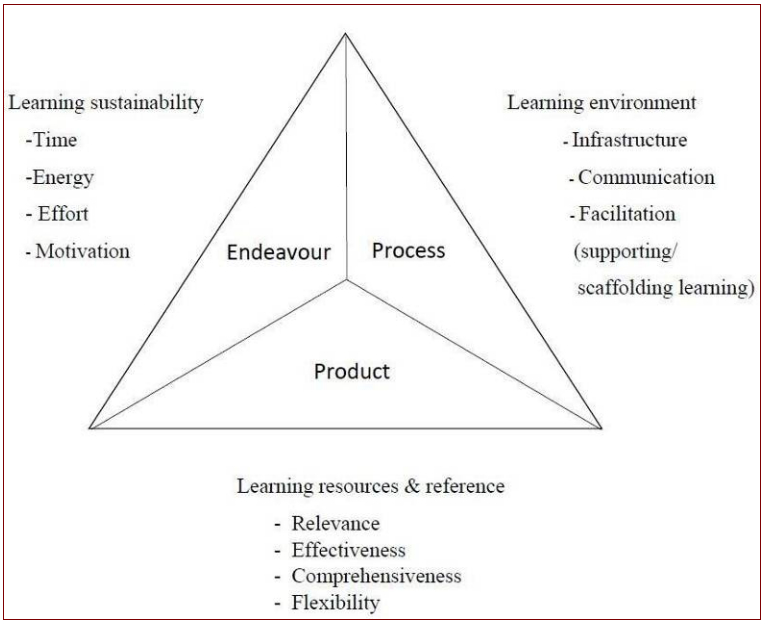
The end-of-scheme survey has shown students' general satisfaction with the Scheme (see Appendix V). In terms of helping with their grammar skills, 56% of respondents mentioned that it did help. Regarding the usefulness of the grammar and reading sections of IGSS, 52% and 53% of respondents, respectively, said that it was useful. In addition, 54% of respondents wrote that the reading section of the Scheme was interesting. It is believed the feedback survey could have been made more useful for learning design purposes, obtaining opinions or suggestions from students regarding their experience (e.g. problems or challenges faced, some feel-good aspects in completing the activities, etc.) in the online learning offered by the Scheme. As the Scheme also intends to help students acquire independent learning skills, feedback questions that can increase students' involvement in their learning (e.g. asking students to suggest useful references or resources that they have found), or questions that allow students to reflect on their interests or preferences should help bring out personal elements in learning, highlighting students' ownership and responsibility.

The trial run of the Scheme has pointed to the usefulness and importance of learning analytics to help understand students' learning patterns, their online behaviour and learning pathway, which will influence evaluation of the Scheme and help make informed judgment about development of learning design on the Scheme. After a thorough discussion between ELC and DST teachers, a list of suggested actions to be taken for the official launch of the Scheme was made (see Appendix VI).

5. IGSS learning design conceptual framework

A quest for a conceptual framework was made after an analysis of students' feedback and IGSS team members' comments, as well as a review of the existing system to collect relevant information for improvement of learning design. The primary purpose of the conceptual framework is to assist ELC in the further development and future review of IGSS.

Since student engagement has been in the forefront of the Scheme design, the effectiveness and efficacy of IGSS depended much on the extent to which students engaged in learning on the Scheme. Three major dimensions to support and enhance the aspect of student independence in online learning within the Scheme have emerged from analysis and review of the data collected, namely learning as a process, learning as a product and learning as an endeavour, as shown in the diagram on the next page.



A conceptual framework for program evaluation

5.1 Supporting Learning as a Process

This dimension deals with providing a learning environment that can support and facilitate independent learning. It is about the planning, implementation and facilitation of the Scheme. Among the aspects identified in this dimension are procedures of the Scheme, the logistics and co-ordination within the teaching units (ELC and DST), intervention and communication with students. All this is related to an efficient follow-through infrastructure that can help students work through the Scheme from start to finish. An example of how IGSS supports the process of learning would be providing students with an introductory workshop and a suggested timetable to complete the work.

5.2 Supporting Learning as a Product

This dimension is on the quality of the Scheme itself, not just the work (that is the performance) produced by students—the usefulness, accuracy, relevance and effectiveness of the Scheme, ensuring the package of input materials would meet the expectations of independent online learners. The purpose is to help students get maximum results for their efforts while also tapping into students' potentials to enable them to achieve their best performance. An example of how IGSS supports this dimension would be the way it covers different categories of grammar and reading, and provides resource links for students to visit so that each participant can choose what to focus on and create their own output, or 'learning product'.

5.3 Supporting learning as an endeavour

To undertake an endeavour requires hard work. Thus, this dimension draws attention to the necessity of providing support to sustain students' drive, curiosity and passion for learning, as well as their effort, eagerness, motivation, self-confidence and persistence during their learning. An example of how IGSS supports this dimension would be the variety and frequency of feedback students are given and the gamification of the Scheme. Also included here is the analytics that are provided to participants to keep track of their own progress throughout their learning journey. This dimension also helps the Scheme designers to learn more and understand better the student dynamic which, in turn, helps drive or guide the improvement needed on the Scheme.

6. Concluding Thoughts

A close examination of the Scheme's trial run has revealed the importance of IT support to the learning environment. More assistance in terms of availability and expertise of the technical staff is needed to improve the virtual learning environments and to leverage learning analytics tools to obtain a profile of the students and their learning behaviour and engagement. Information such as that on the intensity of learning effort, selected pathways and duration of a sitting, and frequency of a learning act, would help give some insight into students' coping strategies in online learning.

Regarding development of materials, apart from expanding the scope and bank of learning items after the trial run, a critical review of the existing materials and quizzes, ease of navigation and comprehension, as well as validity and relevance of quiz items and learning input would be part of the rigorous evaluation and continuous improvement of the Scheme. The ELC hopes to be able to deploy more resources in this area.

The Scheme is about student empowerment—empowering students to increase their understanding and awareness about proper language usage in a technology mediated environment. Its independent learning approach may not be familiar to students, but it can definitely help lay a solid foundation for autonomous learning using digital means.

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Appendix I: Placement of DST year-one students 2017/2018

Sample

Student ID	English Level	Program
41026039	1/6	CDS
41026148	2/6	ENVS
41026085	3/6	FST
41026139	1/7	APSY
41018086	2/7	FM
41018044	6/7	STAT

English Level, e.g. 1/6 = The student was placed at Level 1 of the 6-Level English ability classification of his/her academic discipline, with Level 1 being the best ability group.
DST has six programs:
CDS: Computer and Data Science APSY: Applied Psychology
ENVS: Environmental Science FM: Financial Mathematics
FST: Food Science and Technology STAT: Statistics

Appendix II: IGSS Achievers at the Top 10% and Bottom 10% of the Result Scale

Top 10% (Sample)

Concurrent Course Grade*		No. of Students	Percentage	
'A' Grade	A	4	9.5%	21.4%
	A-	5	11.9%	
'B' Grade	B+	8	19.0%	59.5%
	B	10	23.8%	
	B-	7	16.7%	
'C' Grade	C+	7	16.7%	19.0%
	C-	1	2.4%	
Total		42		

Bottom 10% (Sample)

Student ID	Total Points	Pre-scheme Result	Post-scheme Result	Differences between Pre- and Post- scheme Scores	Concurrent Course Grade*	Level**
4100026139	196	64	72	8	A-	1/7
4100026160	191	60	84	24	B-	3/7
4100013030	189	32	28	-4	C+	7/8
4100005006	186	76	92	16	B	3/8
4100026070	181	64	76	12	C	6/6

Summary

Concurrent Course Grade*		No. of Students	Percentage	
'A' Grade	A-	4	9.5%	9.5%
'B' Grade	B+	6	14.3%	47.6%
	B	6	14.3%	
	B-	8	19.0%	
'C' Grade	C+	12	28.6%	42.9%
	C	6	14.3%	
Total		42		

* Concurrent Course Grades: Grades obtained by students on the course 'English I' (a 3-credit-bearing English course of 42 classroom hours) which they took while working on IGSS.

** Level, e.g. 5/8 = Student was at Level 5 of the 8-level English ability classification in his/her academic discipline, with Level 1 being the best ability group.

Appendix III: A Comparison between Pre- and Post- Scheme Scores: Below & Above Mean Scores

The maximum score for IGSS was 6355. The mean score was 1480.

The Pre- and Post-scheme scores comparison for students whose IGSS scores are below the mean score of 1480.

Sample

SID	TOTAL	PRE	POST	DIFF
4025	1026	9	13	4
4040	1424	17	18	1
5008	1126	17	14	-3
5013	725	20	19	-1
5021	794	14	16	2
5034	1195	15	17	2
5044	1319	13	20	7
5046	56	9	16	7
13010	1134	9	18	9
13027	985	13	14	1

PRE MEAN	POST MEAN	DIFF
14.75	17.35	2.6

The Pre- and Post-scheme scores comparison for students whose IGSS scores are above the mean score of 1480.

Sample

SID	TOTAL	PRE	POST	DIFF
4010	3726	16	19	3
4029	3153	17	18	1
4037	2066	18	18	0
4045	1498	15	16	1
5009	3221	20	18	-2
13011	2552	14	21	7
13016	2728	12	19	7
13019	2711	13	18	5
13033	2306	19	23	4
13034	1879	14	20	6

PRE MEAN	POST MEAN	DIFF
15.325	18.075	2.75

SID = student ID number
PRE = Pre-scheme Test Score; POST = Post-scheme Test Score
PRE MEAN= Pre-scheme Test Mean Score; POST MEAN = Post-scheme Test Mean Score
DIFF = difference

Appendix IV: IGSS Participant Group VS Control Group

Total Scores of Participants and Control Group on Pre-IGSS and Post-IGSS Grammar Tests

PARTICIPANT GROUP (RANDOM SAMPLE) (N=18)

SID	PRE (21/09/17)	POST (20/12/17)	DIFF
5001	17	21	4
5008	17	14	-3
5009	20	18	-2
5040	17	18	1
13010	9	21	12
13021	9	19	10
13032	18	20	2
13039	13	19	6
26044	10	17	7
26049	18	17	-1
5055	18	19	1
26062	20	21	1
26072	12	17	5
26073	21	25	4
26079	16	20	4
26081	15	22	7
26087	16	19	3
26091	13	13	0

PRE MEAN	POST MEAN	DIFF
15.5	18.89	3.39

CONTROL GROUP (N=18)

SID	PRE (21/09/17)	POST (20/12/17)	DIFF
10001	12	17	5
10008	17	20	3
10009	18	18	0
10040	15	15	0
14010	17	17	0
14021	19	17	-2
14032	17	19	2
14039	17	18	1
14044	19	19	0
14049	18	18	0
14055	17	20	3
14062	16	19	3
14072	17	17	0
14073	16	17	1
14079	15	19	4
14081	13	18	5
14086	16	18	2
14091	19	18	-1

PRE MEAN	POST MEAN	DIFF
16.56	18.00	1.44

Appendix V: Results of IGSS Student Feedback Survey (conducted between 18/12/2017 – 21/12/2017)

No. of completed surveys: 343 (76% of participants)

Questions and answers chosen by 50% or more students to each question
Q1 What did you think about the overall design of the website?
Very or mostly clear and easy to use 68.2%
Q2 Do you think the website would help you improve your grammar skills?
Yes, definitely or mostly 55.7%
Q3 How long did it take to finish the quizzes and reading in IGSS every section?
More than two hours or between one and two hours 74.3%
Q4 Did you use IGSS every week?
Every week or most weeks 67.64%
Q5 How useful did you find the 'Study' section of the website?
Very or mostly 52.19%

Q6 How interesting/fun did you find the 'Study' section of the website?
Very or mostly interesting and fun 44.6% (Somewhat interesting and fun 37.90%)
Q7 Was it easy to understand the rules of the quizzes in the 'Study' section of the website?
Very easy to understand or could mostly understand 72.6%
Q8 How useful did you find the 'Read' section of the website?
Very or mostly useful 53.4%
Q9 How interesting/fun did you find the 'Read' section of the website?
Very or mostly interesting and fun 54.2%
Q10 How useful did you find the personal dictionary of the 'Read' section of the website?
Very or mostly useful 56.6%
Q11 How useful did you find the 'My Progress' section of the website?
Very or mostly useful 56.6%
Q12 How useful did you find the resource links listed on the 'My Progress' section of the website?
Very or mostly useful 56. 6%
Q13 What did you think about the design of the "My Progress" section of the website?
Very or mostly clear and easy to use 63.26%
Q14 Please write down what you think are the best or most useful features of the website.
'Study' Section -- learning grammar; 'Read' Section; 'My Progress' Section and dictionary function; designed well, useful, clear, etc.
Q15 Are there any improvements or features that the website needs? If so, what should be added to the website?
Show correct answers immediately; Add videos, speaking and listening activities, and music; Compatibility (cannot use WiFi/4G and some buttons don't work, etc.); 'Reading' section should be more interesting, etc

Appendix VI : Actions to be taken for Scheme Improvement (Broad Outline Only)

1. Technical (e.g. improve compatibility for all browsers and mobile phones; resolve some operational issues regarding exporting statistical data)
2. Feedback on Correct Answers (e.g. immediate response from the system to each answer, including immediate display of correct answers after submission of answers)
3. 'Reading' Section (e.g. overall improvement to facilitate reading, check comprehension and add features to enhance vocabulary building)
4. Motivational features (e.g. include features that could help motivate and sustain student interest in the Scheme)
5. Scheme monitoring (e.g. reminders to students about their progress on the Scheme and the area(s) that need more efforts)
6. Study Section Expansion (e.g. increase question banks and question types)

Authors' Backgrounds

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	***Mr. Ryan Windsor*** *is a lecturer at the English Language Centre, United International College. He is a British-born TEFL teacher who has a passion for Linguistics. He graduated from the University of Sheffield and received an MA in TESOL with a distinction from the University of Birmingham. He has taught English as a second language in a number of cities in China, including Shenyang, Tianjin and Hangzhou. In recent years, he has developed and taught online courses in both General and Academic English with the goal of spreading the joy of language learning freely across the world.*