# LEARNING THROUGH TECHNOLOGY: A REPORT ON THE IMPLEMENTATION OF A "NEW" E-LEARNING TOOL

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#### **Abstract**

This article discusses an on-going pilot project for improving essay writing at Kristianstad University, Sweden. It presents a so-called boilerplate which has been designed for Master's-level English students. This e-learning tool is used as a cognitive tool that facilitates learning with as opposed to learning through technology. The boilerplate is part of a joint learning system (Kim & Reeves, 2007) in which there are three equal participants in the learning process: the tool, learner, and activity.

As technology is increasingly implemented in education, there is a need to understand pedagogical processes that not only take into consideration the student, but how the technology is used by the student. Our paper discusses the e-learning tool created at Kristianstad University, and looks at the first, preliminary results of its use in connection with pedagogical issues, usability, and interaction.

**Key words**: boilerplate, cognitive learning tool, pedagogy, usability.

## Introduction

Writing is an important means of demonstrating one's knowledge in academia. Increasingly, students and teachers are required to present their research findings in English. The strict conventions pertaining to academic English are not always readily identifiable, neither are they easy to master for English-as-a-Second-Language users. During the spring 2010 term an elearning tool called a *boilerplate* was tested at Kristianstad University, Sweden. A boilerplate is a style template. Originally, it was used in the printing of newspapers and took the form of steel plates containing static elements linked to text, style and format. The name derives from the steel plates used to create boilers on steam train engines. Today, with the advent of modern computers, the term boilerplate incorporates not only static but also graphic components as well as figures and images.

The present article discusses the start-up and first test of the boilerplate at Kristianstad University. It was developed as a cognitive e-learning tool specifically for the Level-IV (120 ECTS) English course during the spring term 2010. An e-learning (electronic learning) tool is based on learning applications that employ electronic methods. The latter includes web-based learning, computer-based learning, virtual classrooms etc. as well as blogging tools, document

147

and presentation tools, video-conferencing tools and 3-D worlds. The Level-IV course, which requires students to write a forty-five page Master's thesis, focuses on the teaching and learning of English as a Second Language. The level-IV thesis poses several challenges for students in terms of length, structure, formatting, and language. As an e-learning tool, the boilerplate provides guidelines in each of the problem areas by incorporating specific instructions as well as pre-programmed formatting and language guidelines.

The pilot study described below was designed to test how effective the boilerplate instructions and guidelines are, where improvements can be made, and what modifications need to be introduced in order to improve the overall effectiveness of the boilerplate. The project also tested an interactive component where help with grammar, spelling and turns of phrase were built into a connected database. In addition, focus was placed on how students and teachers learn to handle the boilerplate, how they perceive the instructions and guidelines, and how user-friendliness may be enhanced in future versions of the tool. Throughout, student observations in the form of questionnaires, e-mails to the technical mediator and regular face-to-face meetings with students and supervisors have resulted in ongoing modifications to the tool. The authors represent two different areas of expertise: academic writing in English, and information technology. Our two different perspectives have been combined to produce a tool that enables students to learn with as opposed to merely through technology. The goal is for students to explore the limits of their own knowledge and extend the latter with the aid of pre-programmed features which indicate the nature of specific problems, e.g. grammar, spelling and punctuation errors without automatically inserting the 'correct' answer.

Section 1 of our article discusses two key terms in the development and evaluation of the boilerplate used on the Master's course: "digital natives" and "digital immigrants" (Prensky, 2001). We discuss how these two terms relate to students' and teachers' use of technology. In section 2, we describe the boilerplate from its initial conception to creation. Section 3 looks at the boilerplate as an e-learning tool for essay writing, while section 4 reviews both the qualitative and quantitative results of the first boilerplate trial.

## Digital Natives, Digital Immigrants, and the Use of Technology

The terms "digital native" and "digital immigrant" have become accepted tropes within higher education as a means of explaining and understanding the rapid technological developments taking place in the digital age. Young people have grown up in a technologically advanced age and are familiar with new digital technologies. Older people, however, are considered to be "a step behind/apart in their dealings with the digital" (Bayne & Ross, 2007). Immersion in digital technologies entails a very different approach to learning, as it is associated with immediate access, instant gratification, and a lack of patience with linear thinking. It is essential that teachers adapt both in terms of teaching method and content to the "native's" way of thinking and understanding in order that they will be perceived as up-do-date and even employable (Prensky, 2001; Oblinger, 2003; Long, 2005; Thompson, 2007).

Working in digital/technological environments offers new ways of communicating and constituting knowledge as well as selfhood. The terms "native" and "immigrant" allow one to understand the differences between the two types of user, as well as their implications for learning. "Natives", such as young learners, are those who are considered to have grown up with the digital environment. "Immigrants", on the other, hand are considered to be older users such as teachers, many of whom belong to this category. This is not to say, however, that the concepts are homogenous: there are indeed significant differences between different natives and immigrants depending on, for example, socio-economic background, age, gender, and exposure to digital environments and aids (Owen, 2004). It should also be noted that the use of internet technology among young people, especially for social networking, does not necessarily result

in a demand for more technologically-focused approaches to teaching and learning at university or college level (JISC, 2007; Bayne, 2005).

The boilerplate described in the present article requires a minimum of technological input from the student: it is the technical specialist as a mediator between program and teacher who tailors the boilerplate to the needs of a specific teacher and course, thereby saving valuable time for students and teachers alike. In this way, the boilerplate overcomes the fundamental problem embedded in the digital native/immigrant debate: it is not the teacher as immigrant who must transform into a native, but the technician working alongside the teacher who provides the technical pre-requisites for digital learning. In this way, both teacher and student can focus on essay subject, content, and method. A functional boilerplate requires an initial investment in time on the parts of the teacher and technical adviser; thereafter, teacher/technical input is kept to a minimum. The gap between "native" and "immigrant" is reduced as the technical adviser takes on the role of mediator. As a result, users are guided through different options and encouraged to make choices that augment knowledge and enable them to develop their existing knowledge and skills. The boilerplate is designed in such a way that it can be updated on a regular basis, is user-friendly and inexpensive to produce.

# The Boilerplate: From Concept to Creation

All students are required to write essays and/or short reports; many more must present essays in English, irrespective of their subject or nationality. The most common writing tool today is a text editor or a more advanced word processor. There are many of these types of programs on the market, including Adobe Reader, Open Office, LyX, etc. In Sweden, many colleges, and universities use MS Word in either the 2003 or 2007 version; Kristianstad University is no exception, employing MS Word 2003. When reviewing the fall 2009 English level-III essays at Kristianstad University, we discussed how teachers could help students focus better on the essay and its content, as opposed to the necessary, but secondary work, i.e. instructions regarding the appearance of the essay, including margins, font and font-size, as well as guidelines for content such as method, aim, and theory.

At the beginning of the spring term 2010, we discussed how to improve the essays in terms of content and appearance. Seminars, group work, and tutorials are a standard part of the course, and extra sessions are added as required for students. Most students use word processors to write essays; the only unproven area was to consider the technological side of essay writing, i.e. the word processor and the student's skill in using it. Certain criteria were considered to be crucial, e.g. availability and language issues, as well as cost and user-friendliness for both students and teachers alike. Even freeware, such as Google Docs, was considered, but was felt to offer too few options. Among alternatives not included were language selection, essay sections that require different page numbers, and footnotes/endnotes.

The market is inundated with new devices and synchronous or real-time distance learning programs for asynchronous and mobile learning, web-based learning, and situated learning, multimodal interaction and augmented devices for learning, as well as content management systems and repositories (Li et al, 2008). All of these have considerable potential but are too expensive for students with limited budgets; in addition, it would have been necessary and time-consuming for both teachers and students to learn a new program. As Kim and Reeves remind us, "instead of using computers as tools to learn "with", teachers [have] focused on helping their students to master the tools themselves" (2007, p.208). To be effective, the boilerplate needed to be created in such a way that both students and teachers alike could take advantage of our e-learning tool without spending valuable time learning a new program (McKeachie & Svinicki, pp. 236-239). Most of the students had used MS Word for their fall level-III essays. Our attention returned to this word processing program as it is installed as standard software on

university computers.

MS Word has generic so-called low-level functions that most users know how to take advantage of, these being the basic formatting issues such as setting margins, adding and editing the header/footer, and choosing the appropriate language. In due course, we considered MS Word's so-called "higher-level" functions and how these work; more importantly, we investigated if they could be modified. The higher-level functions include how to create and alter page-breaks and section-breaks, formatting a dynamic table of contents specific to the required layout of a document, as well as the particular grammar and spelling functions required for a document. These higher-level functions within MS Word were found to be the key to creating a new type of template that we have termed a *boilerplate*. Unlike the system that most average users avail themselves of, the boilerplate takes advantage of higher-level functions, and is modified to suit both the specific subject of the thesis and the conventions of the discipline to which it belongs, as well as the type of document required for the course in question, i.e. literary, research, and journal.

# The Boilerplate: Structural, Methodological, and Mechanical Elements

The core additions to be modified related to both higher-level and lower-level functions of MS Word and are linked to three elements of essay writing: structural, methodological, and mechanical. These elements connect directly to the boilerplate as a cognitive e-learning tool, i.e. one that facilitates learning *with* as opposed to learning *through* technology.

# **Structural Elements of the E-Learning Tool**

The tailored structural components incorporated in our boilerplate are requirements for generic and other topic-specific essays, e.g. the introduction, aim, method, summary, and references. Among the more specific structural items are primary/secondary material review, previous research/theoretical background, analysis and discussion, summary and conclusion, and appendices. Each of these elements is built-in with the correct font and style. All items are preset for each essay element, and the boilerplate takes advantage of the simplistic low-level function known as "choose, highlight and click" to apply the appropriate style. The boilerplate also incorporates guidelines on how to express the correct information in a suitably formal style. As seen in Figures 1, 2 and 3, the structural styles are set to remind one of a professional document. One important feature is the differentiation between essay content and boilerplate instructions. Content is visible as black coloured text, while blue coloured text always denotes instructions to be removed before final submission of the thesis (Figures 4 & 5).

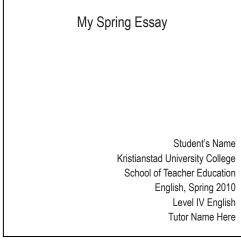


Figure 1. Structural Formatting - Title Page.

Table of Contents					
Acknowledgements	ii				
1. Introduction	1				
1.1 Aim	_1				
1.2 Material	1				
1.3 Method	_1				
2. Previous Research / Theoretical Background	2				
2.1 Previous Research	<b>2</b>				
2.2 Theoretical Background	3				
3. Analysis and Discussion	4				
4. Summary and Conclusion	5				
References	i				
Appendices Appendix 1 Appendix 2	ü ü ü				

**Figure 2. Structural Formatting - Dynamic Table of Contents.** 

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PEDAGOGY Knowledge as power, erudition or capital - PowerPoint Presentation.

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Hall, R. & Hanna, P. (2004) 'The Impact of Web Page Text- background Color Combinations on Readability, Retention, Aesthetics, and Behavioral Intention', Proceedings of the Ninth Americas Conference on Information Systems (AMCIS 2003), Tampa, FL, August 4-6, 2003, 2149-2156.

Figure 3. Structural Formatting - Reference List.

# **Methodological Elements of the E-Learning Tool**

Methodological models relate specifically to the lines along which the essay's particular investigation will be conducted, and the criteria for analysis of the selected material. Students are advised in the instructions incorporated in the boilerplate to define theoretical terminology, explain abbreviations, and refer to other research of relevance to their project. They are instructed to explain the method of investigation employed in the study, e.g. interviews, questionnaires, observation etc. The description of the method should be sufficiently detailed that it is possible for others to replicate the study. Students are also instructed to justify their choice of method(s). The instructions in the boilerplate emphasize the importance of referring to secondary sources on research methods in order to validate the choice of method.

As the student works on each section, she/he reflects on what is to be included/excluded, the style in which the relevant information is expressed, and the level of detail required for each part. As each section is completed, the student deletes the instructions (Figures 4 & 5).

#### 1. Introduction

State your area of study, simply and clearly. Give a brief introduction to the background of the problem investigated so that the reader understands the topic of the essay and why this is relevant. <u>Length</u>: maximum 1 page.

#### 1.1 Aim

Write a detailed description of what you intend to do in your essay, including what aspects you are going to investigate. The aim is the foundation of your essay. All material you collect, the methods you use, and the aspects you analyze must be in line with your aim. Make your aim specific and limited. Length: maximum a few lines.

#### 1.2 Material

A presentation of the primary materials used in your study, i.e. materials from your field studies, or the teaching/testing materials you are going to analyze. Describe the materials you are using in detail, how you collected them, and what motivated your choice of materials/data. Remember, for ethical reasons all parties are to remain anonymous.

Length: this will be as short or as long as your material requires.

# Figure 4. Methodological Information - Student Guidelines.

## 3. Analysis and Discussion

This is the major part of your thesis. Here you present your results, analyze and discuss them, and draw conclusions on the basic problem investigated. This section requires careful structuring and the use of sub-headings. Pay attention to the classification of your material in order to make it comprehensible to the reader. Include tables and/or figures where relevant. Always comment on tables, figures, and examples. Refer to these by number as opposed to their title.

Support your statements by referring to either your own data or the secondary sources discussed in the theoretical background – or both!

This part may be split into two sections: results/analysis, and a discussion section. It is also possible to combine the two sections, depending on your choice of topic and/or method. Often when a qualitative method is used (as is likely in your essay), the sections are combined so that analysis and discussion are intertwined.

Figure 5. Methodological Information - Sections and Sub-Sections.

# **Mechanical Elements of the E-Learning Tool**

The mechanical elements which use MS Word's built-in options to respond to problems in texts are two-fold. Firstly, the user is notified by MS Word's built-in grammar and spelling evaluators. These result in green or red lines appearing underneath text or phrases that the program document considers problematical. For further information, one right-clicks on the questionable word and receives aid from the program. This information shows the problem and/or possible corrections (Figure 6) that are available to the user, who must then employ personal knowledge to decide on the best solution; unfortunately, all too often, the user disregards this opportunity completely.

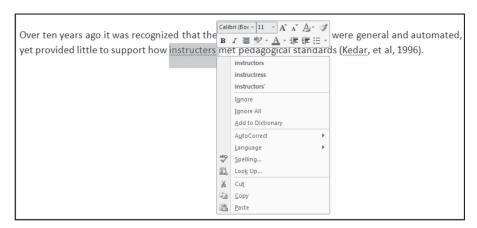


Figure 6. Notification of Correction Needed.

Secondly, both lower and higher-level functions can be set differently within each separate document. This can be seen, for example, when one reads a document from the U.S.A. and the margins are automatically set for inches, or the language choice is set for American English. The program (MS Word) takes advantage of these specific options set in the active document, and automatically corrects the spelling and grammatical mistakes as directed by the creator of the document. The automatic spelling and grammar functions, which are inter-related, are typically set as "on". The document is set to correct the mistakes it recognizes automatically. This option is known as "hijacking" and is where the program does the work, as opposed to "asking" the user. More often than not, these options run without the user either being conscious of or understanding them. Students and even teachers regard the hijacking option as an unattainable higher-level function that does little to expand the user's knowledge base; the hijacking function is, however, a helpful convenience. Our discussion ruled out the choice of using the coloured, underlining option because these can easily be ignored. Our decision was to expand our own knowledge of the hijacking option, and implement a third "hijacking" alternative by creating a database that replaces the questionable word(s) or phrases with changed text and visual cues that make it difficult to disregard the identified mistake.

The database we have created alerts the user to the existence of a problem; she/he receives a message which indicates the specific nature of the error, e.g. \*\*There is a problem: grammar\*\* or \*\*There is a problem: spelling\*\* etc. (Tables A & B). As a consequence, the user is obliged to participate actively in the learning process by correcting the mistake as opposed to merely ignoring it. The mistakes we have incorporated are denoted as "elements", and are noted and added to the boilerplate's database of problems and solutions. As seen in Tables A and B above, "1" is the questionable element, "2" is an automatic generic "highjacked" correction,

and "3" is the learning option we have implemented where the student is informed of the error and must correct the problem him-/herself.

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# **Table A.** Correcting Grammar.

1.	Summer is great last year.
2.	Summer was great last year.
3.	Summer **GRAMMAR CHECK – Verb Tense** great last year.

# **Table B.** Correcting Spelling.

	1.	New teckologies are amazing.					
	2.	New technologies are amazing.					
ĺ	3.	New **SPELLING CHECK - Word** are amazing.					

Figure 7 demonstrates a common error found with English-as-a-Second-Language users, i.e. the incorrect use of "and" as the first word in a sentence. Figure 8 is our incorporated solution that is revealed to the student. This blatant change of text is difficult to ignore, and the student is compelled to correct it before handing in a draft or making a final submission.

In this process, the relevant points and links become more overt, and the irrevelant ones are supressed, until finally one word wins out over the numerous others that are activated. And this is also true for word recognition.

## Figure 7. Grammatical Error - "And".

In this process, the relevant points and links become more overt, and the irrevelant ones are supressed, until finally one word wins out over the numerous others that are activated \*\*GRAMMAR CHECK: Use of "AND"\*\* this is also true for word recognition.

## Figure 8. Our Database Correction Notice.

Other elements incorporated in the boilerplate take into account the use of double or single inverted commas, how to write block quotations, and when and how to use capital letters, colons and semi-colons, italics and bold type. The basis for our extended database of errors and problem areas is derived from previous essays written by students at Kristianstad University. It is our aim to extend the number of errors accommodated within the boilerplate as our project progresses.

## **Boilerplate: Progress and Questionnaire Results**

During the course of the term, the authors have collected comments both from the students using the boilerplate and from their supervisors. The student group consisted of twenty-four students in total; all the students, except three, are from Asia. Their ages range from 21 to 45. The majority have teaching experience or are aiming to become teachers in the near future.

# **Questionnaire and Queries**

The first discussion and preview of the boilerplate with students was on 12 March 2010. Of the 8 students who expressed an initial interest in the tool, all were willing to try the prototype provided that the technical mediator was available at agreed times. An important feature of the boilerplate was that even though it had been created in MS Word 2003, it was fully usable in MS Word 2007, and there were no problems in using the boilerplate on Asian Character operating systems (as opposed to the Latin Character operating system on which the boilerplate is based). Two weeks later, the boilerplate was discussed by the three advisors and the full level-IV essay group; at this time, the remaining 16 students became interested and declared their willingness to use the boilerplate, though with the same condition of receiving help at designated times.

During the demonstration of the boilerplate (12 March), several students expressed surprise that the table of contents is automatically updateable. The ensuing discussion revealed that at least four of the eight students initially interested in using the boilerplate had not known that automatic updating was possible, and that it would save time during the essay writing process for several reasons. One such reason is that when headings/sub-headings are added, deleted, or changed and the table of contents adjusts itself to comply with the new changes, the table of contents updates not only the headings/sub-headings, but the page numbers as well.

The May 2010 questionnaire (Figure 9) was answered by 19 out of the 24 students using the boilerplate. The answers relate to the following three areas: methodological, structural, and mechanical. The questionnaire also asked one question specifically related to the technical aspect of the student's initial use of the boilerplate. The tool was at first considered unnecessary by "Student X", whose mother tongue is English; however, after the initial demonstration and subsequent brief discussion with his supervisor, the student was soon convinced that the boilerplate has the potential to save time and provide useful guidelines for the essay itself. This student also had problems saving the boilerplate to the hard drive (T. Schamp-Bjerede, personal communication, March 30, 2010). The instructions for the boilerplate are in English and the student's version of MS Word is in Swedish. Translating the Swedish version presented no problems, however.

In an e-mail conversation with student "Y", the problem of why all sub-headings of 4 and below (ex. 3.1.1.1) did not show in the table of contents was addressed (T. Schamp-Bjerede, personal communication, May 2, 2010). As it was, we designed the boilerplate to show only three sub-headings because more than three are rarely used in the level-1V type of essay/thesis. This has been noted for the next version of the boilerplate.

Another noteworthy item was the unintentional pressing of short-cut keys by student Z, (T. Schamp-Bjerede, personal communication, May 11, 2010). When two or more keys are pressed simultaneously, an automatic function is activated by the program. Among the most important of these are the "ctrl+c" for automatic copy, and "ctrl+s" for automatic save. Student "Z" notified the technical mediator that there was no response from the program when she misspelled words. In due course, it was discovered that the student had accidentally pressed short-cut keys to turn off this element. Once the problem was identified, it was quickly and easily resolved.

PROBLEMS	
OF EDUCATION	
IN THE 21st CENTUR' Volume 23, 2010	Y
Volume 23, 2010	
155	

St	Statements		Answers Available		
		Do Not Agree	Agree, but have/had trouble	Agree Completely	
1.	You were able to download and save the boilerplate easily		3	16	Technical
2.	You find that you are saving time by using the boilerplate	1	13	5	Structura1
3.	You have noted that you are to correct mistakes because of green or red lines underneath phrases or words	1	7	11	Mechanical
4.	You have noticed items that tell you something is incorrect, for example: **Word Usage: Check Grammar** **Word Usage: Check Verb Tense**	4	5	10	Mechanical
5.	You are more comfortable writing with information being in the boilemplate, for example: Instructions as to "Aims" Instructions as to "Theory"	2	3	14	Methodological
6.	You are more comfortable of a maximum length is specified for each section	1	11	7	Methodological

Figure 9. Questionnaire and Student Response.

The answers to the questionnaire (Figure 9) were provided during the writing process in May 2010. The motivation was to give the students the opportunity to demonstrate how they perceived the advantages and disadvantages of using the boilerplate while writing. The six questions were used as a starting point and designed to be easy to answer. The aim of question one was to make sure that the students did not have any difficulties with saving and using the boilerplate: if the student cannot easily save the boilerplate, it will not be used. While the boilerplate was originally created in an English version of MS Word, it functioned equally well in the other language versions of MS Word used by our students, i.e. Swedish and Chinese program versions.

Statement 1 takes into account how to save the boilerplate and prepare it for use by each individual student. The authors were concerned that the instructions for downloading and saving the boilerplate might not be specific enough; or that they might be too technical; however, only 3 students had trouble with this, while 16 students had no problem at all. Student expertise in this area however, exceeded our expectations.

Regarding structural elements (Statement 2), 68% of the students found that they were indeed saving time using the boilerplate. As noted above, even the native-English speaker appreciated this aspect of the boilerplate. With respect to Statement 3, 58% of the students noted the traditional red/green lines indicating questionable words or phrases (mechanical elements); 53% were responsive to the database components we have created (Statement 4).

With respect to Statement 5, almost 74% of the students claimed that they had gained more confidence in writing and were pleased to have the instructions for aims, method, goals, etc. included in the boilerplate. One reason given was that these instructions were always available until the student removed them, and could be easily be retrieved from the original boilerplate if needed; a paper version, on the otherhand, might be lost. Writing does need to have boundaries in terms of length; the responses to Statement 6 show that 58% thought that the specified maximum length in the instructions was useful; 37% thought that this was very important for the overall structure of the essay.

# **Concluding Remarks**

The boilerplate discussed above has enormous potential for a wide variety of disciplines due to its flexibility, user-friendliness, and low cost. It is also highly democratic as it enables the tool, learner, and activity to participate in the learning process on equal terms. The pilot study of the boilerplate carried out at Kristianstad University has yielded many positive results, as demonstrated in the regular seminars with the students, the replied-to questionnaire, and the feedback from individual students via e-mail and discussions. Among comments received are that students appreciated the comprehensive nature and clarity of the instructions in the boilerplate, the pre-formatting of margins, headings, etc. and assistance with remedying errors such as grammar, spelling, punctuation and style. Students' written English has improved significantly in terms of both accuracy and style.

\The results from the questionnaire confirm the importance of continuing this project and adding to our database. One of the main results was the time saved by students when writing, and by the advisors when reviewing and providing guidance. The inherent repetitiveness of mistakes, be they grammar or spelling, was lessoned thanks to our database that made it imperative for students to correct their work before handing in their final version (Figure 8, and Figure 9 - Statement 4). Among comments received were that students appreciated the comprehensive nature and clarity of the instructions in the boilerplate, and the pre-formatting of margins, headings, etc. 79% of the students expressed their appreciation of the assistance given by the boilerplate as regards remedying errors such as grammar, spelling, punctuation, and style. This in itself demonstrates that the boilerplate works well as a cognitive e-learning tool. In this respect, the results exceeded the authors' expectations. Students' written English has improved in terms of both accuracy and style. One of the external examiners, who was also an examiner in 2009, commented that the quality of essays written this year had increased; to what extent this is due to the boilerplate alone is yet to be established, but the indications are that the tool has had a significant effect on student performance.

The boilerplate provides an opportunity for students and teachers to participate equally in a learning process that provides a basis for lifelong learning that not only enables students to improve their own English but to facilitate the learning of others in their teaching careers. The cognitive e-learning tool is a supportive program that can be extended and improved upon according to the user's needs and to changing conditions. As students' answers to the questionnaire indicate, beyond saving time, the boilerplate enhances students' confidence, and has almost unlimited potential for further development. It can also be adapted to a wide variety of uses, including reports and articles in a range of fields and disciplines where the language of communication is English.

# **Acknowledgement**

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PROBLEMS
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