The impact of interactive whiteboard technology on medical students' achievement in ESL essay writing: an early study in Egypt

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This study investigated the impact of the interactive whiteboard on Egyptian medical students' achievement in essay writing in English as a second language (ESL). First, the writing micro-skills judged essential to help these students improve their essay writing were identified, using a questionnaire which investigated experts' views. This gave rise to a taxonomy of 29 writing micro-skills, which then provided the basis for the design of a teaching module. This module was subsequently taught to an experimental group using an interactive whiteboard to model the target micro-skills, thus exploiting the interactive features of the technology, while a control group was taught using traditional methods (pen, paper and traditional whiteboard). A pre-post essay writing test was developed to assess the impact of the module in both its experimental and traditional versions. Results showed that though the students' essay-writing skills improved in both groups, the use of the interactive whiteboard had no additional beneficial impact on the experimental group's achievement. This raises questions about the link between technological and pedagogical change in enhancing learning.

In an increasingly digital world, the interactive whiteboard (IWB) has appeared as a technological innovation used widely in teaching, and increasingly in the area of English as a second language (ESL). The IWB is a large touch-sensitive board which is connected to both a computer and a digital projector. Additional software may extend the functionality of the board and provide a variety of features, including those which replicate non-digital technologies such as 'flipcharts, dry-wipe boards, overhead projectors, slide projectors and video players' (Kennwell and Higgins 2007: 207). The language often used to describe IWB technology and software ('interactive', 'SMART', 'ACTIV') implies intelligent and dynamic ways of dealing with a wide range of options (Somyürek et al. 2009; Stein and Nyree 2005: 1-2). The uptake of the technology has been dramatic and global (Thomas and Cutrim-Schmid 2010). Kennewell and Higgins (2007: 207) suggest that the popularity of the IWB gives it a different status, compared with other new learning technologies:

> It is unusual to focus educational research on a particular piece of equipment, but the IWB seems to have a pedagogical and cultural status … which makes it different from other pieces of new ICT equipment. In particular, it has been enthusiastically adopted by almost all of the teachers who have one installed in their classrooms, and is sought after by many of the teachers who do not currently have access to one.

The basic functions of interactive whiteboards include moving, showing, hiding, highlighting, animating, retrieving objects or text (Glover et al. 2005). Cogill (2004), for instance, mentions that the IWB can reduce the time required for scribing, model effective presentation of information and increase participation; it is interesting and stimulating, suitable for whole-class engagement and helpful for revision and doing

collaborative tasks. In the area of English language teaching and learning, the IWB is claimed to facilitate the presentation and delivery of a variety of materials. According to Gérard et al. (1999), this happens in three ways: the IWB can present linguistic and socio-cultural elements effectively, particularly through multimedia; it is supportive of interactivity in the classroom by encouraging participation; and it can help teachers organize and present their materials more efficiently. The technology is generally considered to be useful to students' acquisition of a range of language skills.

The research reported here focuses on the teaching of writing skills to medical students. In the medical field, writing is considered a particularly important skill. According to Showalter and Griffin (2000: 165):

> [W]riting is not just a mechanical tool that doctors need to use, like a scalpel; learning to use language well is basic to a doctor's ability to communicate deeply with patients, to find the right words for the right moment, and to address ethical problems with sensitivity and critical awareness.

Medical students' writing skills are considered by Chur-Hansen and Vernon-Roberts (2000a), who emphasise how important it is for practitioners to write clear and comprehensible texts: 'the ability to communicate through the written word is a fundamental skill for medical practitioners and medical students, who must relay information to colleagues and patients' (642). Commenting on Chur-Hansen's research on developing the writing of medical students, Showalter and Griffin (2000: 196) state that medical students need to know how to 'develop an argument' in writing and 'critically evaluate theories', which requires 'a sophisticated connection between thinking and writing that cannot be self-taught'. They suggest that teaching should focus on helping students understand what an argument is, how a theory can be criticized, and how a record of an argued topic and its evaluation be can conveyed to colleagues, patients and the public. For Showalter and Griffin (2000: 165), medical-related essay writing should develop students' awareness of the importance of writing as part of their more general communication skills.

Writing as a means of communication is complex and involves many aspects, processes and components. In a classic article, Drake (1953) states that fundamentally, a writer should bear the audience in mind. Facets such as 'sentence structure, punctuation, vocabulary, ~~voice, posture, and diction~~… are important to the overall situation of successful writing' (85). Chur-Hansen and Vernon-Roberts (1998: 644) consider that 'content, jargon, values, vocabulary, tense, articles, spelling, legibility, conventions, and fluency' can be used to determine success in writing. Writing expertise also relates to developing control over discourse quality, format, material, problem solving, and related self-autonomy which are described as 'inclusive complex processes', (Cumming 1989: 127).

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It is argued by Showalter and Griffin (2000: 165) that medical students can write more effectively if they are exposed to models which reflect good writing. They stress that students need extensive practice and peer-evaluation. They also encourage the idea of engaging students in discussions and arguments, and offering them a broader experience of language:

> [A]t a higher level, to become better writers, medical students must read more: medical articles, case histories, essays, short stories and novels... Doctors need to be fluent in the specialized language and jargon of medicine, but they also need to communicate clearly and directly with the general public, and with lawmakers. (p 165)

Chur-Hansen and Vernon-Roberts (1998: 351), meanwhile, report that educators complain that medical students do not know when to use formal and informal language and that they therefore have difficulties with patient interaction. El-Koumy (2002: 220) also points out that writing needs to be integrated with reading, and that educators need to support medical students' knowledge in a way that does not just focus on functional outcomes (such as communication with colleagues and patients) but also on a student's total development of comprehension, usage, and wider knowledge of medical language. Rawson et al. (2005) agree that students in the medical professions often have deficiencies in the writing skills needed for their education and their subsequent career. They argue that attention needs to be directed to discipline-specific writing skills, rather than the more general writing skills often taught. In their study they show that weekly writing exercises based around six specific aspects of students' writing (comprehensiveness/thoroughness, accuracy, conciseness, logical organization, justification of assertions, and use of appropriate terminology) can improve medical students' writing, particularly in terms of increased ability to use medical terminology appropriately. These difficulties are common for second language learners, who generally find writing challenging (De Larios et al., 2006: 100) and still affect medical school students whose competence in English may be more advanced (Chur-Hansen and Vernon-Roberts (2000b: 646) though amenable to improvement through specific practice and training (Tomlinson, 1983: 7).

~~Concentrating on the difficulties which second language (L2) students face when learning second language writing, De Larios et al. (2006: 100) assume that it is more difficult and problematic for these students to convert their thoughts to written form than do their counterparts using their first language. This could be argued to be a normal phenomenon as learners of L2 writing are unlikely to be a fluent as first language speakers. Although the case might be different for medical school students whose competence in English may be more advanced (Chur-Hansen and Vernon-Roberts (2000b: 646). It must still be acknowledged that L2 writing is not those students' first language and is therefore likely to pose some difficulties. Evidence also clearly indicates that practice and training in writing in the second language may substantially give way to improved communication in writing (Tomlinson, 1983: 7).~~

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Comment [EAB3]: I'm concerned that this para appears to add little which is not self evident or well-established. Could I ask you to consider whether it is needed, or whether the key point could be expressed more concisely and, for example, linked into the previous para? Para deleted and key point incorporated into previous para - SH

The research study

The research reported here comprised two stages. The first stage identified the fact that Egyptian medical students' writing skills were perceived as an area of relative weakness. This emerged from the results of a language skills questionnaire[1] administered by the first author during the academic year 2005-2006 in order to gauge the views of lecturers, assistant lecturers, physicians and current students at an Egyptian medical school. As Table 1 shows, lecturers, assistant lecturers and physicians indicated low levels of satisfaction with students' writing skills, although students themselves expressed greater satisfaction with their writing skills than with their speaking and listening skills.

Table 1 : IELPII's Language Skill Questionnaire Results – about here

One explanation for this relative dissatisfaction may be the fact that in Egyptian medical schools, ESL writing (whether within an English course or within another

course) can only be taught in the first two years of the curriculum. This is enshrined both in the regulations for the particular institution involved in this study, and those for the Egyptian Higher Education system generally. During these two years, furthermore, students practise paragraph writing rather than essay writing. Prior to admission to medical school, students will only have studied paragraph and short letter writing in their preparatory and secondary school curriculum, and thus often find it challenging to construct the longer and more complex forms of writing needed for their professional work.

The English language classes delivered at the medical school in this study focused on long reading passages, medical diagrams, medical terminology, grammar and dialogues, with most material connected to the medical context. Although, as discussed earlier, many writers (Bergus et al. 2006; Burch et al. 2005; Chur-Hansen and Vernon-Roberts 2000a; Chur-Hansen and Vernon-Roberts 2000b; Edwards 2001; Langford et al. 2004; Ludbrook 2007; Moran et al. 1991; Pololi et al. 2004; Showalter and Griffin 2000; Zhuo 1989) emphasize the importance of writing skills for medical students, it remains the case that in the Egyptian context, courses provide little opportunity for developing writing skills beyond the intermediate level achieved at secondary level.

Modelling effective forms of ~~language~~ discourse and specific forms of appropriate texts is essential if ESL learners are to progress beyond basic competence to a more advanced command of the language involving higher level discourse competence as (Cots (2006: 336) argues. Vickers and Ene (2006: 109) suggest that advanced level learners can improve their writing through increased grammatical accuracy by developing their ability to compare their own writing with texts by native speakers. Peer feedback has also been shown to help ESL learners improve their writing (Rollinson 2005: 23). It was thus judged that there was a need for greater clarity in the focus and content of writing courses for Egyptian medical students, and that such courses needed to support the development of writing skills at the appropriate level through effective demonstration and modelling by the tutor and opportunities for targeted practice by the students. Developing such a writing course was an important dimension of this research and provided the context for assessing the impact of the interactive whiteboard on teaching effectiveness.

This second dimension of the study reflects the fact that Egyptian universities have not widely exploited new learning technologies, such as the interactive white board (IWB), in the teaching of writing skills to medical students. Technological advances ~~'require teachers and administrators to review which equipment they should use'~~ constantly require educators to review the range of equipment they might use (Timucin 2006: 262). Indications from the literature suggest that a technology, such as the IWB, can make a difference in language teaching. Evidence for this claim in terms of measured attainment is discussed below in the discussion of findings. In the context of this particular study, the literature suggested that the IWB could play a particularly useful role by offering effective modelling of written language forms and supporting more effective questioning and interaction in the classroom (Smith et al. 2005).There therefore appeared to be a good match between the need to improve the writing skills of Egyptian medical students and the potential offered by the interactive whiteboard. To our knowledge, no studies had previously researched the impact of the IWB in this specific context.

The present study thus aimed to explore whether teaching the specially-designed module using an IWB would be any more or less effective at improving medical school students' ESL essay writing skills, compared with teaching it in a traditional

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Comment [EAB5]: Is it Cots who suggests that 'modelling effective forms of language is essential in order to progress beyond basic competence? Or is this reference here simply in relation to critical discourse analysis? Attempted to clarify - SH

Comment [SEH6]: Quotation removed as suggested

way. The participants involved were 60 medical school students enrolled in the third year of study at a university school of medicine in Egypt. They were graduates from public secondary schools who had all achieved the entry requirement set by the medical school, a Secondary Stage General Point Average of 96.9%. They had mostly studied English for six years.

An experimental/control single-group design was adopted, with the impact of the pedagogic intervention to be measured by a pre-test/post-test of writing skills. The experimental group was to be taught with an IWB while the control group would be taught using a traditional whiteboard, pen and paper. The central hypothesis was formalised as follows: that the IWB group's score ~~on the post-test~~improvement would be significantly different statistically from that of the traditional group. The experiment was conducted during the summer of 2008 and was given ethical clearance by the universities involved.

In order to identify the potential writing micro-skills to be targeted in the design of the pedagogic module, the existing literature on medical students' writing~~?~~ was investigated. Seventy-three such micro-skills were identified, some of them clearly overlapping (see Appendix A). The following table identifies the areas or types of micro-skills identified and the degree of emphasis (indicated by the number of ticks) given to each area in key sources.

Table 2: Areas of writing covered by the micro-skills – about here

A writing micro-skills questionnaire was then developed which asked specialists ~~or experts~~ to judge (using a four point scale) the importance for medical students of each of the 73 writing micro-skills. Only those judged 'important' or 'most important' – a total of 29 overall - were selected as the basis for the design of the essay writing module; see Appendix B. For the relative weights of these skills in the module, and their assessment value, see Appendix C.

Lessons for the module focused on the presentation of key aims, the modelling of written language forms (such as paragraph structure) and interactive exercises to encourage the student to identify these features and to practise them in their own writing. Two ways of implementing the module were then devised. Activities for the experimental group were designed to exploit the visual and interactive features of the IWB such as images, highlighting, drag and drop, hide and reveal (based on Glover et al. 2005) as well as opportunities to model the objectives and forms of writing covered interactively. Activities for the control group were based on traditional paper-based activities and a conventional whiteboard.

Apart from the IWB, which enabled explicit modelling and interaction with content in terms of its physical manipulation on screen, all aspects of the teaching approach for both groups were identical so as to assess any additional benefit offered by the IWB. To avoid students from the two groups discussing the module with each other, groups were taught on different days and students were asked not to talk about the module. The teaching of both groups was undertaken by an instructor at the medical school and the researcher; each taught half the module to both groups and jointly assessed the tests in order to minimise experimenter bias. In order to help both instructors develop confidence in incorporating IWB techniques in their classes, they undertook around six hours of training (Higgins, Beauchamp and Miller, 2007).

An essay writing pre-post test was designed to measure any improvements in essay-writing skills. Face validity was established by submitting the test to evaluation

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Comment [EAB8]: Could you identify the exact area of literature which was investigated: all research on academic writing courses? writing courses for medical students?

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by experts (an applied linguist and a measurement psychologist). Both groups undertook the essay pre-test before the module started and took the post-test at the end of the module. Both tests were marked by two raters and inter-rater agreement calculated (0.82) to establish the reliability of the marking using a commonly accepted formula (Ebel, 1951). The pre-test was administered in the summer of 2008 and the scores of each group (see Table 3) were analysed to ensure that there were no significant differences between the two groups.

Table 3: Pre-test results - about here
1=control 2=experimental

Although the control group mean was 38.17 and the experimental group 39.30, the difference was not statistically significant (p = .779).

Findings

The post-test was administered at the end of the 14 ~~XX~~ week module. As shown in Table 4, both group means on the post-test were higher than the pre-test mean scores, suggesting that students' essay writing skills had improved as a result of the essay writing module. However, when results for the experimental and the control group were compared, there was no statistically significant difference between the groups (p = .488).

Table 4: Experimental results – about here

The mean post-test score of the control group is in fact slightly higher than that of the experimental group. Table 5 shows that this represented an effect size (Hedges' g) of -0.18.

Table 5: Effect size difference – about here

The answer to our specific study question is thus that using the IWB in teaching did not make any additional difference to the development of the medical students' essay writing skills.

These results were not predicted or anticipated but they are similar to a number of other quantitative studies in this area and contribute to a growing body of evidence of the lack of impact of IWBs on tested learning outcomes. Although the early literature is enthusiastic about the potential of IWBs, and anecdotal and attitudinal improvement is reported (Glover et al. 2005; Higgins et al. 2007) the emerging quantitative evidence does not substantiate this enthusiasm (Higgins 2010; Torf and Tirotta 2010). Bell (2000) for example, who adopted a similar experimental design to the study reported here (based on an experiment group taught with an IWB, video and projector, and a control group taught in the traditional manner), found that the students' achievement in writing was not statistically different between the groups at post-test.

In terms of the effect size or the extent of the difference, the impact on writing is of the same order as that found in a study by Higgins (2010) of the impact of IWBs on primary (or elementary) school pupils' writing in English (N =4964, *effect size* = 0.04) which was also non-significant. In another large scale-study (N =4116), Somekh et al. (2007) were unable to identify any effects - 'either positive or detrimental' (21) - on

Comment [SEH10]: We have replaced the split-half data (which was calculated on the piloting phase), with the inter-rater reliability calculation based on the actual data in the study.

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7-11 year old pupils' attainment in writing, deriving from use of IWBs. Looking at impact on learning at secondary school level in a range of areas, including writing and English language, Moss et al. (2007: 18) were also unable to find any significant benefits in terms of pupils' attainment:

> The small-scale study concluded that there was no evidence of any impact, positive or negative, of increased IWBs in subject departments on attainment at KS3 and KS4 in Maths, Science and English.

Where larger effect sizes have been reported, it is not clear that the difference is due to the technology or rather to differences in pedagogical approach. Dhindsa and Emran's (2006) study of the teaching of chemistry, for example, revealed statistically significant gains for students who were taught using IWBs (*N~~n~~* =115), with an effect size difference of 0.52; however the IWB group also received constructivist instruction which seems more likely to account for the difference. Marzano and Haystead's (2009) collation of school teachers' action research studies undertaken for Promethean Ltd. ~~which~~ found a significant and substantial overall improvement (*effect size* = 0.44) ~~can~~ may therefore also be questioned in terms of the link between the technology and the improvement reported. In the light of more rigorously controlled studies, it appears that the gains reported were more likely to have derived from the process of active enquiry by the teachers in their own classrooms (Darling-Hammond and Bransford 2005), rather than the technology. Thus, where differential impact is noted in the literature, it ~~therefore~~ seems to relate more to changes in teachers' pedagogy than to their exploitation of the technology's technical interactivity (Higgins et al. 2007).

The present results are also ~~support~~ consistent with those found by ~~another study~~ ~~(~~Glover et al. (2003: 1), which investigated the impact of IWBs on the classroom teaching of mathematics at secondary level. They concluded ~~that 'interactivity has been seen as an aid to traditional teaching rather than the driving force for understanding'~~ (2) and that:

> … lesson effectiveness hinges on the technological capability of the teacher in responding to divergent needs, and that the process of exposition, demonstration, exemplification and conceptualization is best managed through the use of the IWB as a means of revisiting earlier material. (Glover et al. 2003:1)

Overall the assumption that the introduction of this technology will lead to improvement in assessed learning outcomes should therefore be questioned. It appears that underlying pedagogy is more significant than the technology itself.

Conclusions

The main intent of this study was to investigate the impact of the IWB on improving medical school students' essay writing skills. Based on the results obtained, the outcomes of the research can be summarised as follows. Firstly, 29 target writing micro-skills for teaching Egyptian medical students were identified, based on a consensus obtained from the literature and validated by expert opinion. The writing module based on these micro-skills then proved to be effective in improving ESL essay-writing skills, as shown by overall improvement in both experimental and control groups. However, the use of the IWB in teaching this module failed to have any impact on further improving medical students' achievement in this area.

Comment [c13]: Is this the total number of students in the study (in which case, capital *N*), or the number taught using IWBs (in which case, lower-case *n) N*

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Comment [c14]: Referring to teachers?

Comment [c15]: As this study is 2010, it cannot 'be supported' by a 2003 study

Comment [c16]: Is this study BY Glover et al. or reported by Glover et al.? If the latter, could you provide the reference for the original study even if this is then 'cited in Glover et al. 2003: 1'. If by Glover et al. 2003, we can delete 'another study)'

Comment [c17]: The significance of this is not entirely clear to me – attempted to clarify - SH

It should be noted that the students involved in the study and the lecturer who was new to the technology were all enthusiastic about the potential of the IBW. The results of the study, however, remind us that we need to be cautious about assuming such positive views will translate into improved learning. While technological tools may appear to make learning more interesting and attractive, depending on their capabilities, it is important to clarify more precisely how they can have a direct impact on learning. Our analysis suggests that while they may create a lively atmosphere for learning, this needs to be built on by the teacher.

Suggestions for further research

In light of these conclusions, the following suggestions for further research are proposed. The use of micro-skills in the design of curricula and in lesson planning for ESL writing appears to offer potential for further development and research. Next, there needs to be further exploration of the potential impact of IWBs on learning. This may only be beneficial, for example, when combined with pedagogical development which can properly exploit the technical features of the equipment (Dhindsa and Emran 2006; Higgins 2010) perhaps as a 'disruptive innovation' (López 2010). Although the visual appeal of the IWB may help retain students' attention, this of itself may not lead to any direct improvement in learning outcomes, and the engagement supported by the IWB may need to be harnessed in other ways to be beneficial for learning.

Note

1 The language skills questionnaire was associated with the Integrated English Language Program II (IELPII). This was a USAID-funded program targeting a number of goals including improving the English language skills of Egyptian students in general.

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Comment [EAB18]: Could you identify where this took place? Or who published the Proceedings

http://authorsites.co.uk/authorpage.php?page=books&author_id=67&book_id=229

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Appendix 1

Author	*Micro-skills identified*
McCarhty, Merier and Rinderer (1985)	to use grammar successfully to use the right word/ words to compose a sentence/ a paragraph/ an essay to punctuate a passage on one page to weave sentences into a paragraph to produce a theme
Graham and Harris, (1998)	to write a story (e.g. including the feelings of a main character, setting etc.)
Pajares and Johnson, (1994); Shell et al. (1989, 1995)	to complete a term paper to make up a short fiction story to write a composition in a letter form to a friend
Southern Illinois (2007)	to respond fully to an assignment to show proper critical thinking to present a clear topic statement to express the aim manifestly in a convincing way to use facts in a good sequence to provide supporting details to show a unity, focus and organization to use suitable language appropriate to the audience to resort to decisive sources when necessary to document and use citations properly to use grammar punctuation, words, spelling and format perfectly to display original and creative thinking
Fenapupae Conference (2007)	to follow rules of spelling, punctuation and capitalization to use an acceptable core vocabulary and appropriate word order to use acceptable grammatical systems, patterns and rules to express a particular meaning in different grammatical forms to use cohesive devices in written discourse to use the rhetorical forms and rules of written discourse. to convey links and connections between events. To communicate such relations as main ideas, supporting ideas, new information, given information, generalization and exemplification to develop and use a battery of writing strategies, such as accurately assessing the audience's interpretation, using pre-writing devices, using paraphrases and synonyms, soliciting peer and instructor feedback and using feedback, for revising and editing
Orwig (1999)	to use orthography correctly, including script, spelling and punctuation rules to use the correct forms of words. This may mean using forms that express the right tense, or case or gender to put words together in correct word order to use vocabulary correctly to use the style appropriate to the genre and audience to make the main sentence constituents, such as subject, verb, and object, clear to the reader to make the main ideas distinct from supporting ideas or information to make the text coherent, so that people can follow the development of ideas

	recognizing the linear sequence of sounds
	mastering writing motions and letter shapes
	recognizing the need for space between words
	writing quickly
	writing freely what you want to write
	to judge how much back- ground knowledge the audience has on the subject and make clear what it is assumed they don't know
Ranelli and Nelson (1998)	to write a one- or two-sentence answer to a specific test question
	to compose a one- to two-page essay in answer to a question
	to write a term paper of 15 to 20 pages
	to write a scholarly article for publication in a professional journal in your field
	to write a letter to the editor of the daily newspaper about a health-care topic
	to write useful class notes
	to prepare a paper that reads as a balanced account on a controversial topic
	to compose a paper summarizing a reading assignment
	to correctly spell all words in a one-page paper
	to correctly punctuate a one-page paper
	to write a paper with good overall organization (e.g., ideas in order, effective transitions)
	to correctly use plurals, verb tenses, prefixes, and suffixes
	to research the subject
	to correctly use parts of speech (nouns, verbs, adjectives)
	to identify problems to be solved that the topic suggests
	to make clear statements of ideas
	to avoid common grammatical errors of standard written English
	to quote sources accurately
	to write effectively under pressure
	to paraphrase properly
	to collaborate with others during reading and writing on a given project
	revise to improve word choice
	to revise awkward phrasing and vague language
	to choose words that a reader can understand
	to know how the reader will use your document
	to state the purpose of the writing to the reader
	to follow a revision strategy to select, add, substitute, or delete information when the prospective readers to the paper have changed

Appendix 2. The writing micro-skills identified as important for medical school students

Grammar and presentation
(1) To use grammar successfully
(2) To use the right word/ words
(3) To compose a sentence/ a paragraph/an essay
(4) To punctuate a passage on one page
(12) To use formatting correctly
(19) To spell correctly all words in a one-page paper
(21) To avoid common errors of standard written English – using the right register

Structure and argument
(5) To weave sentences into a paragraph to produce a theme
(6) To present a clear topic statement
(7) To make the main ideas distinct from supporting ideas or information
(8) To provide supporting details
(9) To show a unity and focus
(17) To write introductions, conclusions, and structure
(22) To convey links and connections between events
(18) To construct balanced account on a controversial topic
(20) To identify problems to be solved that the topic suggests
(27) To write with good overall organization (e.g. ideas in order, effective transitions)

The Writing Process
(13) To master writing motions and letter shapes
(14) To recognize the need for space between words
(15) To write quickly
(16) To write freely what you want to write
(25) To write effectively under pressure
(26) To collaborate with others during reading and writing on a given project
(24) To revise to improve word choice

Audience
(10) To judge how much background knowledge the audience has on the subject and make clear what it is assumed they don't know
(11) To communicate a message or information
(23) To use the style appropriate to the genre and audience
(28) To choose words that a reader can understand
(29) To state the purpose of the writing to the reader

Appendix C -The micro-skills in the module and their relative representation weight* and maximum assessment points

*Relative weight was considered when preparing the module content (based on micro-skill frequency in literature and the average total points jurors gave on the questionnaire).

Micro-skill	Relative weight	Maximum Score
1. To use grammar successfully	20	4
2. To use the right word/ words	16	3
3. To compose a sentence/ a paragraph/an essay	11	2
4. To punctuate a passage on one page	12	2
5. To weave sentences into a paragraph to produce a theme	11	2

6. To present a clear topic statement	11	2
7. To make the main ideas distinct from supporting ideas or information	9	2
8. To provide supporting details	10	2
9. To show a unity and focus	8	1.5
10. To judge how much background knowledge the audience has on the subject and make clear what it is assumed they don't know	8	1.5
11. To communicate a message or information	8	1.5
12. To use format perfectly	8	1.5
13. To master writing motions and letter shapes	8	1.5
14. To recognize the need for space between words	8	1.5
15. To write quickly	8	1.5
16. To write freely what you want to write	19	4
17. To write introductions, conclusions, and structure	10	2
18. To prepare a paper that reads as a balanced account on a controversial topic	8	1.5
19. To spell correctly all words in a one-page paper	10	2
20. To identifying problems to be solved that the topic suggests	8	1.5
21. To avoid common errors of standard written English – using the right register	17	3
22. To convey links and connections between events.	10	2
23. To use the style appropriate to the genre and audience	11	2
24. To revise to improve word choice	19	4
25. To write effectively under pressure	7	1
26. To collaborate with others during reading and writing on a given project	8	1.5
27. To write a paper with good overall organization (e.g., ideas in order, effective transitions)	11	2
28. To choose words that a reader can understand	17	3
29. To state the purpose of the writing to the reader	11	2

1. The average total points jurors gave on the questionnaire is calculated by the following formula: total points/ maximum cell points (4). Results were approximated to the nearest unit.
2. These are based on a percentage of the module representation weight points, i.e. a representation weight divided by five.

Table 1 : IELPII's Language Skill Questionnaire Results

Question	Percentage of participants giving a specific answer											
How far are you satisfied with the following language skills of current students?	Lecturers *(10 lecturers of different specialities, e.g. Obstetrics, anaesthesia, orthopaedics, etc.)*			Assistant lecturers *(with teaching roles- 10 in different specialties)*			Graduate students/ current physicians *(10 in different specialties)*			Current students *(20 in different specialties in 3rd and 4th years)*		
	Very satisfied	satisfied	dissatisfied	Very satisfied	satisfied	dissatisfied	Very satisfied	satisfied	dissatisfied	Very satisfied	satisfied	dissatisfied
Listening	20%	20%	60%	20%	20%	60%	10%	30%	60%	0%	25%	75%
Writing	**10%**	**20%**	**70%**	**10%**	**20%**	**70%**	**10%**	**30v**	**60%**	**5%**	**40%**	**55%**
Speaking	20%	20%	60%	10%	20%	70%	10%	20%	70%	10%	20%	70%
Reading	50%	50%	0%	50%	40%	10%	70%	20v	10%	70%	20%	10%

Table 2: Areas of writing covered by the micro-skills

Source	Area/Type of Micro Skill Stressed												
	Grammar	Spelling	Vocabulary	Punctuation	Composition	Development	Writing a letter	Writing a story	Creative Writing	Style	Format and Organization	Research-related	Culture -related
McCarthy Merier and Rinderer (1985)	√		√	√	√√	√							
Graham and Harris, 1998								√					
Pajares and Johnson, 1994; Shell et al. (1989, 1995)					√√√		√	√				√	
Southern Illinois (2007)	√	√	√√		√√√ √	√√√ √√			√√	√	√√	√√	
Fenapupae Conference (2007)	√√√ √	√	√√√	√	√√	√√ √√							
Orwig (1999)	√√√	√√√	√	√	√√	√v			√	√			
Ranelli and Nelson	√√√	√	√√√	√	√√√ √√√		√ √		√		√√	√√√	√

(1998)					√√√ √								

Table 3: Pre-test results

Group	N	Mean	SD	SE
Trad (1)	30	38.17	14.515	2.650
IWB (2)	30	39.30	16.497	3.012

1=control 2=experimental

Table 4: Experimental results

Group	N	Mean	SD	SE
Trad (1)	30	86.17	18.28	3.38
IWB (2)	30	82.90	18.01	3.29

1=control 2=experimental

Table 5: Effect size difference

Group	Means	Effect-size (Hedges g)	Confidence Interval
Trad (1)	86.17		(Lower) (Upper)
IWB (2)	82.90	-0.18	-0.68 0.33

1=control 2=experimental