

Developing EFL/ESL Cognitive Structures Using a Mobile App to Exploit a Spatial Morphology of Verb Forms in Simple Sentences

Robert C. Meurant

Founding Director, The Institute of Traditional Studies • Seojeong College University
rmeurant@me.com • <http://web.me.com/rmeurant/INSTITUTE/HOME.html>

Abstract

Ubiquitous language learning requires appropriate learning objects to be made accessible to learners in the right form, at the right time, and in the right place. This need can be met through providing appropriate spatial morphologies of content, utilizing mobile devices and relevant apps. English verb tenses and forms cause understandable confusion for EFL/ESL students. But by situating the required learning objects in the learner's awareness, she may creatively imagine the necessary schema, navigate through them, and determine the correct formal expression of what she intends. A spatial morphology of English verb forms and tenses is proposed that generates simple sentences. This encourages the formation of appropriate cognitive structures in the language learner's mind, while the spatial schema provides for feasible on-screen implementation in interactive mobile applications for smartphones and tablets. The primary intended realization is thus of two complementary forms: as an aide-mémoire in the learner's mind, and as an App for the iPad and for tablets in general.

Keywords: mobile app, language learning object, EFL/ESL, English verb structure, iPad

1. Introduction

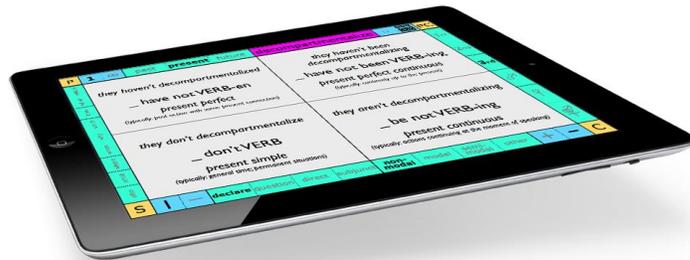


Figure 1. A simulation of the App, as yet unrealized, on the iPad 2

Fiaidhi [1] makes the timely observation that in the rush towards ubiquitous learning, appropriate learning objects need to be made accessible to learners at the right time and in the right place. This applies to second language learning, where EFL/ESL students quite understandably face confusion in their recall, choice and use of English verb tenses and forms that are appropriate to an intended communicative act. The best place to locate such learning objects is, through assimilation, in the learner's own awareness. She can then creatively imagine the necessary schema, navigate through them, and so determine the correct formal expression for the communicative act she intends. More effective EFL/ESL learning can thus be achieved if students are provided with an adequate spatial morphology of English tenses and forms. This supports the assimilation of appropriate cognitive schema, in combination

with exposure to relevant interactive apps. I use the term “spatial morphology” not in the normal linguistic sense, but in the traditional sense of a spatial organization of form.

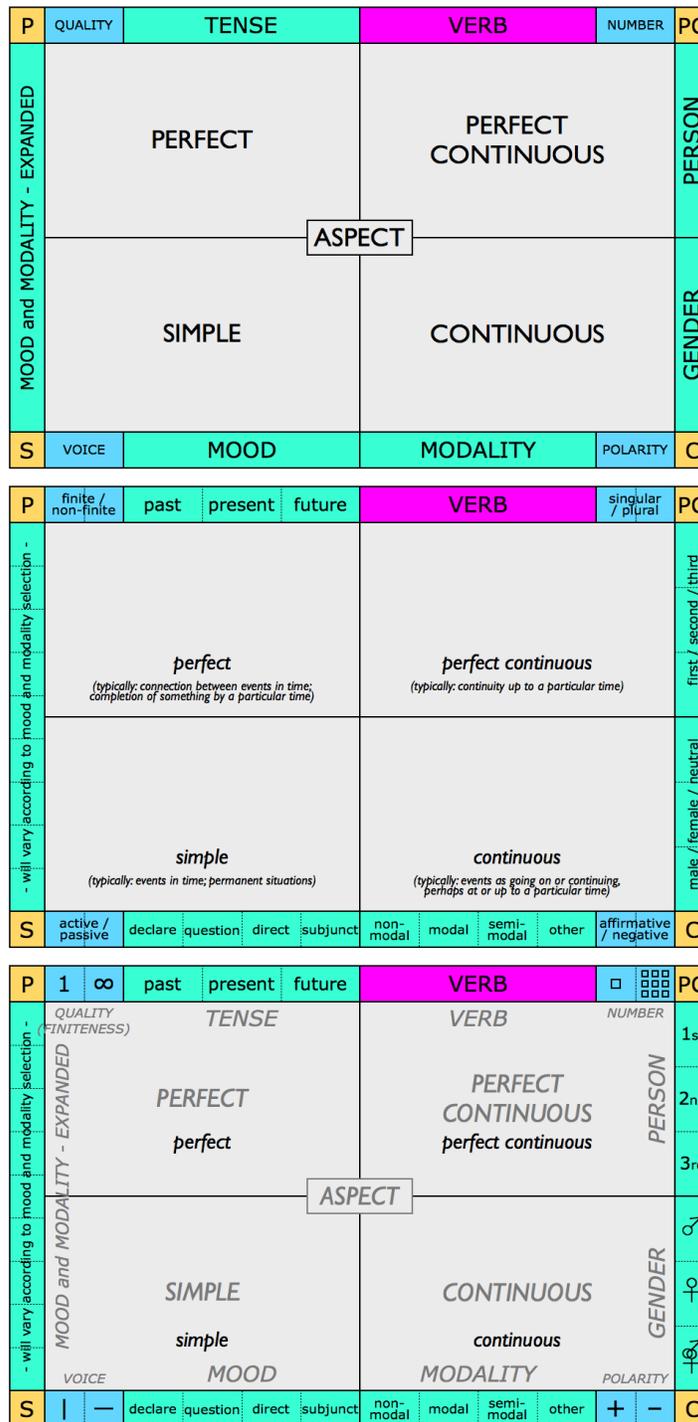


Figure 2. a. The basic structure showing a. the main grammatical categories; b. differentiation of the main grammatical categories into options; and c. various options as actually presented (with categories appended in grey text).

This paper proposes a spatial morphology of the English verb forms and tenses that is then applied to generate simple sentences. The spatial morphology enables appropriate cognitive structures to form and stabilize in the language learner's mind. The visual spatial structure allows ready implementation in landscape mode in interactive digital resources, particularly the software that drives on-screen displays. The primary intended uses are for apps for mobile devices such as smartphones - which students are increasingly likely to have with them both within and outside class, as I have elsewhere surveyed [2, 3, 4]. More particularly, this morphology, together with the Apps that I envisage would exploit it, is suited to tablets such as the iPad - which will increasingly be used by students [5, 6]. Further suggested applications are for head up displays (e.g. by computer gamers, Stoodle users, pilots, vehicular drivers etc.); and for electronic dictionaries and online resources (e.g. online dictionaries and other grammatical resource webpages). Thus the primary intended realization of this proposal is two-fold and complementary: firstly as an *aide-mémoire* in the learner's mind; and secondly as an App for the iPad (and for other tablets). These two realizations complement one another: using the App will help the learner form and stabilize appropriate language structures, while a developing facility with those structures can encourage further exploration and mastery of the App. Having students use the proposed App should significantly assist their learning of correct linguistic cognitive structures.

2. Formal Structure and Usage

2.1. Spatial Morphology

The spatial morphology derives from configurations commonly found in Sacred Geometry, Art and Architecture. In traditional use, these are effective in assisting the learning and contemplation of what are often highly complex cosmologies and thus the realities that they are deemed to mediate (as in Lawlor [7]). The primary geometrical form I have used is the archetypal fourfold *aedicule*, well known in traditional art, architecture and symbolism. Here it becomes a flat vertical rectangular surface in the normal field of vision - rather than a horizontal plan - as in Figure 2. As the most basic and essential form that the verb takes, the Infinitive form of the verb is imagined at the center (though in practice, it would usually be displaced to the upper right periphery). For a given verb, the inner surface developed as a four-fold zone displays the verb's four primary aspects, sentences that accord with those aspects, their construction, and their use. The other main grammatical categories are located on the peripheral border.

For the most common Finite verbs and forms, the Simple verb - located in the bottom left inner quadrant - is the starting point for the four fundamental grammatical Aspects. The Simple form may be imagined to be displaced and extended to the right to generate the Progressive/Continuous form of the verb located at bottom right. An (imaginary) octave of the Simple may be imagined directly above to locate the Perfect form at top left. Finally, that Perfect form may be imagined displaced and extended to the right, while simultaneously providing an octave of the Progressive directly above it, to generate the Perfect Progressive/Continuous located at top right.

P	1	∞	past	present	future	VERB	□	PC				
whose	(default non-modal prompts)					1st 2nd 3rd		♂ ♀ ♂♀				
whom									_ have VERB-en perfect		_ have been VERB-ing perfect continuous	
how									_ VERB simple		_ be VERB-ing continuous	
which	declarative mood					non-modal	+ -	C				
why	S	I										

P	1	∞	past	present	future	walk	□	PC				
whose	to walk					1st 2nd 3rd		♂ ♀ ♂♀				
whom									I have walked _ have VERB-en present perfect <small>(typically: past action with some present connection)</small>		I have been walking _ have been VERB-ing present perfect continuous <small>(typically: continuity up to the present)</small>	
how									I walk _ VERB present simple <small>(typically: general time; permanent situations)</small>		I am walking _ be VERB-ing present continuous <small>(typically: actions continuing at the moment of speaking)</small>	
which	declare question direct subjunct					non-modal modal semi-modal other	+ -	C				
why	S	I										

P	1	∞	past	present	future	walk	□	PC				
whose	present perfect continuous <small>(typically: continuity up to the present)</small>					1st 2nd 3rd		♂ ♀ ♂♀				
whom									I have been walking		_ have been VERB-ing	
how									You have been walking		present perfect continuous	
which									He/She/It has been walking		(typically: continuity up to the present)	
why									We have been walking			
when									You have been walking			
where									They have been walking			
what	declare question direct subjunct					non-modal modal semi-modal other	+ -	C				
who	S	I										

Figure 3. Finite/Present/Active/Declarative/Non-modal/Affirmative showing:
 a. archetypal sentence construction; b. Singular/First Person sentence construction with central Infinitive shown; c. a full conjugation of Number, Person and Gender.

The other major grammatical categories are located on the border around the four edges, which comprises interactive buttons, tabs, and drop-down menus as required. The important TENSE-ASPECT-MODE dimension is provided vertically, as in Figure 2. The bare Infinitive - the base form of the verb - is entered in the right-hand major top field or selected from its drop-down menu. Grammatical categories of QUALITY (i.e. Finiteness), NUMBER, VOICE and POLARITY are located as side options of the top and bottom borders. The top right NUMBER, the right side PERSON, and the left side GENDER fields work in conjunction. On the bottom border, MODE is differentiated into major fields of MOOD and MODALITY. These options are further expanded by context-aware fields that are located on the left side border. Verbs are here presumed to be either Intransitive or Optionally Transitive, thus sentence objects are not required, nor are they displayed. (If required, the left border could instead display Obligatory/Optional Transitive/Intransitive TRANSITIVITY fields, and could interact with Dynamic/Stative verb PROCESS. Verb VALENCY 1/2/3 could also be included; refer Crowley et al. [8]).

2.2. Envisaged Usage

In use, the first act of the ESL/EFL learner is to enter at top right a base verb i.e. the bare Infinitive form of the verb. This is done either by selecting from a drop-down menu, or by typing combined with intelligent word recognition/completion. (If preferred, this could also display in the center as in Figure 3B, and an associated dictionary could display its meanings). Ideally, default settings of grammatical categories would accord with the most common states for English of the target learner level. However, these could be reset in a Settings menu, as might varieties of English (UK/US/Konglish/Singlish etc.). The user then navigates through the grammatical schema, by choosing options from the border fields in accord with the desired use. On the top and bottom borders, minor (i.e. narrow) side fields represent binary choices; these are exclusive “or” choices, except NUMBER, which allows neither, either, or both options to be selected. The top border QUALITY (i.e. “Finiteness”) at left provides for an exclusive choice of Finite or Non-finite Verb form. At bottom, VOICE at left allows for exclusive Active or Passive choice; POLARITY at right allows for exclusive Affirmative or Negative choice.

The major (i.e. wide) top, bottom and right border fields allow for more than two options. TENSE is a context-aware item; when Finite Quality is selected, it provides an exclusive *Past, Present* or *Future* choice, assuming MODALITY is *non-modal*. QUALITY is also context-aware, and provides for Finiteness; when it is *Non-finite*, the options will depend upon other settings e.g. whether VOICE is *Active* or *Passive*. Along the bottom border, MOOD at left provides an exclusive choice of Declarative (Indicative) “*declare*”, Interrogative “*question*”, Imperative “*direct*” or Subjunctive “*subjunct*”. The context-aware menu along the left side border may be activated by these choices, e.g. when the Interrogative Question is selected, the left border could show Wh- Question words *who/what/where* etc. as prompts and/or could toggle with Polar Question auxiliaries *do/does/am/are/is/will/can/may* etc. The bottom border at right provides for the exclusive selection of MODALITY: *Non-modal, Modal, Semi-modal, or Other* modal. When Modal is selected, the contextual menu of the left side border displays the Modals *may/might/can/could* etc. (which could then be further conditioned by Tense).

P	1	∞	past	present	future	walk	□	PC					
whose	<p><i>you had walked</i></p> <p><i>_ had VERB-en</i></p> <p><i>past perfect</i> <i>(typically: action before a particular past time)</i></p>						<p><i>you had been walking</i></p> <p><i>_ had been VERB-ing</i></p> <p><i>past perfect continuous</i> <i>(typically: continuity up to a particular past time)</i></p>		1st				
whom									2nd				
how									3rd				
which	<p><i>you walked</i></p> <p><i>_ VERB-ed</i></p> <p><i>past simple</i> <i>(typically: past events)</i></p>						<p><i>you were walking</i></p> <p><i>_ been VERB-ing</i></p> <p><i>past continuous</i> <i>(typically: actions continuing at a particular past time)</i></p>		♂				
why									♀				
when									♀♂				
where													
what													
who													
S	I	—	declare	question	direct	subjunct	non-modal	modal	semi-modal	other	+	-	C

P	1	∞	past	present	future	eat	□	PC					
whose	<p><i>they haven't eaten</i></p> <p><i>_ have not VERB-en</i></p> <p><i>present perfect</i> <i>(typically: past action with some present connection)</i></p>						<p><i>they haven't been eating</i></p> <p><i>_ have not been VERB-ing</i></p> <p><i>present perfect continuous</i> <i>(typically: continuity up to the present)</i></p>		1st				
whom									2nd				
how									3rd				
which	<p><i>they don't eat</i></p> <p><i>_ don't VERB</i></p> <p><i>present simple</i> <i>(typically: general time; permanent situations)</i></p>						<p><i>they aren't eating</i></p> <p><i>_ be not VERB-ing</i></p> <p><i>present continuous</i> <i>(typically: actions continuing at the moment of speaking)</i></p>		♂				
why									♀				
when									♀♂				
where													
what													
who													
S	I	—	declare	question	direct	subjunct	non-modal	modal	semi-modal	other	+	-	C

P	1	∞	past	present	future	walk	□	PC					
whose	<p><i>will he/she/it have walked?</i></p> <p><i>will _ have VERB-en?</i></p> <p><i>future perfect</i> <i>(typically: action before a particular future time)</i></p>						<p><i>will he/she/it have been walking?</i></p> <p><i>will _ have been VERB-ing?</i></p> <p><i>future perfect continuous</i> <i>(typically: continuity up to a particular future time)</i></p>		1st				
whom									2nd				
how									3rd				
which	<p><i>will he/she/it walk?</i></p> <p><i>will _ VERB?</i></p> <p><i>future simple</i> <i>(typically: information about the future; future events)</i></p>						<p><i>will he/she/it be walking?</i></p> <p><i>will _ be VERB-ing?</i></p> <p><i>future continuous</i> <i>(typically: actions continuing at a particular future time)</i></p>		♂				
why									♀				
when									♀♂				
where													
what													
who													
S	I	—	declare	question	direct	subjunct	non-modal	modal	semi-modal	other	+	-	C

Figure 4. a. Finite/Past/Singular/2P/Active/Declarative/Non-modal/Affirmative;
 b. Finite/Present/Plural/3P/Active/Declarative/Non-modal/Negative with
 different verb; c. Finite/Future/Singular/3P/Active/Interrogative/Non-
 modal/Positive constructions.

The right side border differs in that the choices need not be exclusive, but as for NUMBER may be (partially or totally) inclusive, and are intended to function in conjunction with the Number selection (at right of the top border). PERSON can be selected as none, one, some or all of *First/Second/Third*. GENDER can be selected as none, one, some or all of *Male/Female/Neutral* (of course in English it is usually only of relevance if Third Person Singular has been selected). These provisions of exclusivity allows the display of just one PERSON, or of a restricted selection (by user choice), or of a full conjugation.

The App then displays in the inner quadrant the four Aspects of the specific verb base and chosen grammatical categories, showing the four simple sentences, sentence constructions, tenses, and typical uses (here the uses have been adapted from Swan [9]). The same Verb form thus assumes the same relative position in each inner rectangle. For any given TENSE, the relation between Simple, Continuous, Perfect, and Perfect Continuous aspects is readily apprehensible. I anticipate this sustained spatialization of Aspectual relationships will significantly assist the learner in internalizing the target language structure.

2.3. Finger Gestures

When the FINITE quality is chosen, double-tapping any ASPECT (i.e. an inner quadrant) zooms that quadrant to fill the entire inner space, and allows more detailed information to be displayed. A full conjugation could be shown, as in Figure 3c. A two-finger single tap of a zoomed interior collapses it to return to the four-quadrant view.

Cycling through the TENSES is achieved by horizontally swiping the interior, as shown in Figures 4 and 5b. Swiping right regresses the Tense being displayed, while swiping left advances the Tense from Past to Present, or Present to Future. Settings allow the horizontal swipe to include the Infinitive, so the user can cycle through Past-Present-Future-Infinitive.

Provided just one NUMBER and PERSON has been selected, vertical swiping of the interior zone allows cycling through the six Number/Person combinations, refer Figure 4:

... - 1PS - 2PS - 3PS - 1PP - 2PP - 3PP - ...
 (... - First Person Singular - Second Person Singular - Third Person Singular -
 First Person Plural - Second Person Plural - Third Person Plural - ...).

The Number/Person displayed is advanced by swiping the interior (quadrants) upwards e.g. 2PS > 3PS, while it is regressed by swiping downwards e.g. 2PP > 1PP.



Figure 5. Simulations of the App: a. on the iPhone 4S, b. Touch gesturing on the iPad

P	1	∞	past	present	future	walk	□	PC					
whose	he had been walked					he had been being walked (?)			1st				
whom	_ had been VERB-en					_ had been being VERB-en			2nd				
how	<i>past perfect passive</i> <small>(typically: action before a particular past time)</small>					<i>past perfect continuous passive</i> <small>(typically: continuity up to a particular past time)</small>			3rd				
which	he was walked					he was being walked			♂				
why	_ been VERB-en					_ been being VERB-en			♀				
when	<i>past simple passive</i> <small>(typically: past events)</small>					<i>past continuous passive</i> <small>(typically: actions continuing at a particular past time)</small>			♂				
where									♀				
what									♂				
who									♀				
S		-	declare	question	direct	subjunct	non-modal	modal	semi-modal	other	+	-	C

P	1	∞	past	present	future	walk	□	PC					
whose	she has been walked					she has been being walked (?)			1st				
whom	_ have been VERB-en					_ have been being VERB-en			2nd				
how	<i>present perfect passive</i> <small>(typically: past action with some present connection)</small>					<i>present perfect continuous passive</i> <small>(typically: continuity up to the present)</small>			3rd				
which	she is walked					she is being walked			♂				
why	_ be VERB-en					_ be being VERB-en			♀				
when	<i>present simple passive</i> <small>(typically: general time; permanent situations)</small>					<i>present continuous passive</i> <small>(typically: actions continuing at the moment of speaking)</small>			♂				
where									♀				
what									♂				
who									♀				
S		-	declare	question	direct	subjunct	non-modal	modal	semi-modal	other	+	-	C

P	1	∞	past	present	future	walk	□	PC					
whose	it will have been walked					it will have been being walked (?)			1st				
whom	_ will have been VERB-en					_ will have been being VERB-en			2nd				
how	<i>future perfect passive</i> <small>(typically: action before a particular future time)</small>					<i>future perfect continuous passive</i> <small>(typically: continuity up to a particular future time)</small>			3rd				
which	it will be walked					it will be being walked			♂				
why	_ will be VERB-en					_ will be being VERB-en			♀				
when	<i>future simple passive</i> <small>(typically: information about the future; future events)</small>					<i>future continuous passive</i> <small>(typically: actions continuing at a particular future time)</small>			♂				
where									♀				
what									♂				
who									♀				
S		-	declare	question	direct	subjunct	non-modal	modal	semi-modal	other	+	-	C

Figure 6. Finite/Singular/3P/Passive/Declarative/Non-modal/Affirmative:
 a. Past/Male, b. Present/Female, and c. Future/Neutral.
 (Bracketed terms help identify the appropriate tense).

3. Pros and Cons

For the motivated student, the App encourages playful exploration of the effects of varying the values of different grammatical categories and a deepening appreciation of the structure of the English language. Correspondences between verb forms for a particular tense are evident in relation to other tenses, e.g. the relationships revealed by a horizontal left swipe sequence of Past Progressive below with Past Perfect Progressive above, through Present Progressive below with Present Perfect Progressive above, to Future Progressive below with Future Perfect Progressive above. The learner can then realize that the same Verb form assumes the same relative position in each configuration: the Perfect Past is in the top left quadrant of the Past tense, the Perfect Present is in the top left quadrant of the Present tense, and the Perfect Future is in the top left quadrant of the Future tense. This spatialization of grammatical structure should significantly assist learning, given that space is one of the most important aspects of our experience of the world, as can readily be appreciated in the fundamental importance of spatial prepositions in structuring diverse kinds of formal complexity [10].

P	1	∞	modal present				walk				□	PC											
should	I may have walked											I may have been walking											1st
shall	_ may have VERB-en											_ may have been VERB-ing											2nd
would	modal perfect											modal perfect continuous											3rd
will	<i>(typically: past action with some present connection)</i>											<i>(typically: continuity up to the present)</i>											
must	I may walk											I may be walking											♂
could	_ may VERB											_ may be VERB-ing											♀
can	modal simple											modal continuous											♂
might	<i>(typically: general time; permanent situations)</i>											<i>(typically: actions continuing at the moment of speaking)</i>											♀
may																							
S	I	—	declare	question	direct	subjunct	non-modal	modal	semi-modal	other	+	-	C										

P	1	∞	modal past				walk				□	PC											
should	couldn't she have walked?											couldn't she have been walking?											1st
shall	could not _ have VERB-en?											could not _ have been VERB-ing?											2nd
would	modal past perfect											modal past perfect continuous											3rd
will	<i>(typically: action before a particular past time)</i>											<i>(typically: continuity up to a particular past time)</i>											
must	couldn't she walk?											couldn't she be walking?											♂
could	could not _ VERB?											could not _ be VERB-ing?											♀
can	modal past simple											modal past continuous											♂
might	<i>(typically: past events)</i>											<i>(typically: actions continuing at a particular past time)</i>											♀
may																							
S	I	—	declare	question	direct	subjunct	non-modal	modal	semi-modal	other	+	-	C										

Figure 7. a. Finite/Modal Present/Singular/1P/Active/Declarative/Modal/Affirm. may; b. Finite/Modal Past/Singular/3P/Female/Active/Interrogative/Modal/Negative could.

P	1	∞	infinitive	VERB	□	PC		
whom whom how which why when where where what who	1st	2nd	3rd	(to) have VERB-en <i>perfect infinitive</i>	(to) have been VERB-ing <i>perfect continuous infinitive</i>	♂ ♀ ♂		
				(to) VERB <i>simple infinitive</i>	(to) be VERB-ing <i>continuous infinitive</i>			
	S	I	—	declarative mood	non-modal	+	—	C

P	1	∞	passive infinitive	VERB	□	PC		
whom whom how which why when where where what who	1st	2nd	3rd	(to) be being VERB-en <i>passive perfect infinitive</i>	(to) have been being VERB-ing <i>passive perfect continuous infinitive</i>	♂ ♀ ♂		
				(to) be VERB-ing <i>passive simple infinitive</i>	(to) have been VERB-ing <i>passive continuous infinitive</i>			
	S	I	—	declarative mood	non-modal	+	—	C

Figure 8. a. Non-finite/Infinitive/Active/Declarative/Non-modal/Affirmative and b. Non-finite/Infinitive/Passive/Declarative/Non-modal/Affirmative sentence constructions (VERB-en represents the Past Participle of the Verb).

The limitations of this spatial morphology of grammar are primarily those of the structural complexity of language in general and of the English language in particular (even expert Grammarians argue over issues of linguistic structure). These constraints must be set against the honest and understandable limitations of the second language learner, who is not infrequently overwhelmed when faced with the structural complexity of the target language.

Thus the spatial morphology I am advancing seeks to maintain a satisfactory compromise between a simplicity that can be comprehended, and a complexity that does the language justice. To that end, this morphology does not include verbal objects (though it readily could), and is restricted to simple sentences (so compound and complex sentences are not dealt with). The treatments of passive and of non-finite forms have been greatly simplified; and imperative and subjunctive moods as well as semi-modal and other modalities, though provided for, have as yet to be included. The proposal thus seeks to balance an adequate complexity with a desirable simplicity that will thus provide accessibility, in accord with the learner's interlanguage.

The proposed App, including all finger gestures, is designed to meet the Apple iOS Human Interface Guidelines [11]. As initially developed, the display resolution accords with the 960 x 640 px iPhone 4 and 4S screens as in Figure 5a, but is more appropriate for the 1024 x 768 px iPad 1 and iPad 2 screens, on which it fits comfortably, as in Figure 5b. (The anticipated release of a hi-res iPad 3 in February 2012 suggests the App would then benefit from redesign to exploit that higher resolution). Border widths of 50 px at top/bottom and 48 px left/right mean both dimensions of the 864 x 540 px interior are rich in factors, allowing convenient subdivision into equal columns and rows ($864 = 2^5 \cdot 3^3$, $540 = 2^2 \cdot 3^3 \cdot 5$), while minimum button sizes are adequate. Illustrations in this online publication show the color-coding of buttons and tabs, which greatly enhances intelligibility. Please note that images have been reduced in size: it may help to visualize the iPhone or iPad screen for each image, as shown in Figure 5.

4. Conclusion

In common with other categories of human existence, pedagogy is being radically impacted by the rapid development and convergence of the ICT revolution. This is evident in second language pedagogy, as I have elsewhere stressed [12]. In language learning, appropriate cognitive schema are required that might be effectively utilized in conjunction with new language learning strategies that are suited to our digital age. As Fiaidhi observes [1], the pervasive impact of the Internet, mobile apps, smartphones and now tablets means that online learning objects are required to satisfy an accelerating demand for ubiquitous learning at the right time and in the right place. It is my belief that - as the ways in which language is conceived, imagined, learnt, and utilized are rapidly changing - these learning objects will also need to be provided in the right form. Envisaging and developing spatial morphologies that aid learning - via a dialectic between the cognitive space of the imagination and the digital environment of mobile apps - will I trust contribute to that exciting educational and technological evolution.

5. Acknowledgments

This paper is a revised and expanded version of a paper presented at the December 2011 FGIT Future Generation Information Technology Megaconference: UNESST International Conference on U- and E-Service, Science and Technology at Jeju-do, and published in their proceedings [13]. A related paper was published in the same month in the journal TESOL Review [14]. As always, my sincere thanks to Prof. Kim Tai-hoon of SERSC for his steady support, which I greatly appreciate.

References

- [1] J. Fiaidhi, Towards Developing Installable e-Learning Objects utilizing the Emerging Technologies in Calm Computing and Ubiquitous Learning. International Journal of u- and e- Service, Science and Technology, 4(1), 2011, pp. 1-12. Retrieved 14 July 2011 from: http://www.sersc.org/journals/IJUNESST/vol4_no1.php
- [2] R.C. Meurant, A Preliminary Survey of the Use of Cell Phones, Electronic Dictionaries, SMS, Email, Computers and the Internet by Korean College EFL Students with Respect to Patterns of L1:L2 Language Use and the Associated Language Learning Strategies Used in Accessing Online Resources. In S.-s. Kim, J. H. Park, N. Pissinou, T.-h. Kim, W. C. Fang, D. Slezak, H.-R. Arabnia, & D. Howard (Eds.), 2007 International Conference on Multimedia and Ubiquitous Engineering. IEEE Computer Society, Los Alamitos CA, 2007, pp. 767-772.

- [3] R.C. Meurant, Second Survey of Korean College EFL Student Use of Cell Phones, Electronic Dictionaries, SMS, Email, Computers and the Internet to address L1:L2 Language Use Patterns and the Associated Language Learning Strategies Used in Accessing Online Resources. In: *Advances in Information Sciences and Services 2*. AICIT, Gyeongju, 2007, pp. 240–246.
- [4] R.C. Meurant, Using Cell Phones and SMS in Second Language Pedagogy. *Journal of Convergence Information Technology*, 2(1), 2007, pp. 98–106.
- [5] R.C. Meurant, The iPad and EFL Digital Literacy. In: T.-h. Kim, S. K. Pal, W. I. Grosky, N. Pissinou, T. K. Shih, & D. Slezak (Eds.): *Signal Processing and Multimedia*, CCIS 123. Springer-Verlag, Berlin Heidelberg, 2010, pp. 224–234.
- [6] R.C. Meurant, The iPad as a Tool for Developing Korean EFL Digital Literacy. In: *The Applied Linguistics Association of Korea 2010 ALAK International Conference: Interdisciplinarity in Applied Linguistics*. ALAK, Seoul, 2010, pp. 189–195.
- [7] R. Lawlor, *Sacred Geometry: Philosophy & Practice* (Art and Imagination Series). Thames & Hudson, London, 1982.
- [8] T. Crowley, J. Lynch, J. Siegel, and J. Piau, *The Design of Language: An Introduction to Descriptive Linguistics*. Longman, Auckland, 1995.
- [9] M. Swan, *Practical English Usage* (3rd edn). Oxford University Press, Oxford, 2005.
- [10] R.C. Meurant, Spatial Play in Language Acquisition. *JCIT: Journal of Convergence Information Technology*, 2(1), 2007, pp. 55–60.
- [11] Apple Inc., *iOS Human Interface Guidelines*. Apple Inc., Cupertino, 2011. Retrieved from <http://developer.apple.com/library/ios/#documentation/userexperience/conceptual/mobilehig/Principles/Principles.html>
- [12] R.C. Meurant, *Applied Linguistics and the Convergence of Information Communication Technologies: Collected refereed papers 2006-2009*. The Opoutere Press, Auckland, 2010.
- [13] R.C. Meurant, A Spatial Morphology of the English Verb Structure of Simple Sentences Aids Appropriate Cognitive Structures Develop and Offers EFL/ESL Potential as a Mobile App. In: T.-h. Kim et al. (Eds.): *UNESST 2011: U- and E-Service, Science and Technology*, CCIS 264. Springer-Verlag, Berlin Heidelberg, 2011, pp. 160–167.
- [14] R.C. Meurant, A Proposal for a Spatial Morphology of Verb Forms in EFL/ESL to Develop Cognitive Structures using Mobile Apps. *TESOL Review* Vol. 3, Daegu Hanny University, Daegu, December 2011, pp. 127–144.

Author



Robert Meurant gained his BArch (Hons) and PhD in Architecture from the University of Auckland, New Zealand and his MA in Applied Linguistics from the University of New England, Australia. He is Founding Director of the Institute of Traditional Studies, an independent research institute and think tank, which he established in 1984 to encourage contemplative scholarship from within a traditional perspective. He has published six books and well over 50 refereed papers on applied linguistics and ICT, structural morphology, traditional architecture and geometry, space habitation and structures, natural harmony and ontology, and Asian Studies. His current research interests include the impact of the convergence of Information and Communications Technology on Applied Linguistics and Second Language Acquisition, with particular regard to EFL/ESL in East Asia.