

Strategic web development for language learning support in workplace education

策略性網站發展——為職業教育設計的語言學習支援

LI Kam-cheong

School of Education and Languages, The Open University of Hong Kong

KWOK Lai-yin, Percy

Hong Kong Institute of Educational Research, The Chinese University of Hong Kong

CHEUNG Lai-wan

School of Business and Administration, The Open University of Hong Kong

Abstract

This paper sketches major developmental processes of building a web for workplace professional communication through Chinese and English languages at a tertiary institution in Hong Kong. The strategic development of the web comprised three phases, namely, pre-design, design and post-design ones. In the pre-design phase, learners' needs in terms of the levels of web support and the necessary contents were assessed. Together with a comparative analysis of similar relevant webs offered by tertiary institutions in Hong Kong, the tentative assessment results were employed to generate a site plan for the web. In the design phase, when the webpages were written, a number of strategic factors were taken into consideration. In the post-design phase, the web was tested, modified and finalized through an evaluation survey. Eventually, new research issues relating to online distance learning and its further web advancement will be briefly addressed.

Keywords

online distance learning, web development strategy, workplace education

摘要

本文報告一個為支援中英文職業傳意學習而建立網站的主要發展過程。網站發展包括三個主要策略性階段。在設計前階段，發展人員就學員對網站的支援需求程度及必要內容進行了評估，並與其他具相近功能的網站作比較分析，利用評估結果編訂網站的藍本。在設計中階段，發展人員考慮了多個策略性因素，製作網站的具體內容。在設計後階段，網站經過測試，且透過用戶問卷調查完成評估、修訂及進一步的完善工程。最後，本文探討一些在線遙距教育的相關研究課題。

關鍵詞

網上遙距學習，網站發展策略，職業教育

Introduction

The World Wide Web (WWW) has rapidly become a source of daily communication and education. By 2002, there were already 8,712,000 webs on the Internet, about 6.6% of them related to the provision of educational services (OCLC, 2004). In Hong Kong, there is a high computer and internet penetration rate. A total of 60.0% of households have personal computers at home connected to the Internet (Census and Statistics Department, 2004). By May 2003, So-net HK, a division of Sony Corporation of Hong Kong Limited, announced the launch of its new global roaming Internet access service that consisted of the broadband wireless Internet roaming access service and dial-up Internet roaming service with global coverage of more than 20,000 points of presence (POPs) in over 150 countries and allowed So-net HK subscribers to access the Internet when traveling overseas (So-net Hong Kong, 2003). Operating in an environment with such a high penetration rate, educational institutions are now making extensive use of the Internet technology to enhance their delivery. One local tertiary institution in open and distance learning, The Open University of Hong Kong (OUHK), has been one of the pioneers in applying technology to

distance education. Since 2001, the majority of its courses have been presented with varying degrees of online elements (OpenLink, 2001). Language education is no exception to this phenomenon, with virtually all the universities in Hong Kong using the WWW to support their students' language learning.

There is little doubt that the WWW brings language education important benefits, such as 24-hour availability and interactivity (Carley & Dailey, 1998), and that online facilitation will be the teaching mode of the future (Ryan et al., 2000). However, there are numerous problems emerge from using the WWW in language learning, such as the learner's computer self-efficacy and the huge investment in hardwares and softwares (Lim, 2001). Besides this, the burst of the Internet bubble at the arrival of the new millennium involved not only business dot-coms but also education dot-coms (ref. Carr & Blumenstyk, 2000). This also highlights future problems, such as limitations of the WWW in its infiltration into people's life. Language educators are prudent on the way to go online. This underlines the importance of tactical planning and careful design of the project.

This paper reports the strategic development

processes of a new web - the World of Professional Communication (WPC)¹. WPC aims to support the learning of workplace communication. Acting as a showcase, the WPC's strategic development exemplifies the advancement of computer-mediated technologies for distance learning. The instructional scheme of the key processes of its strategic web development will be outlined in three successive phases. After evaluation of the WPC development in the post-design phase, research implications will be briefly mentioned for its further development in the paper.

Web development scheme

Though there is a plethora of literature on the design of specific features of webs (Hedberg et al., 1994; Boyle, 1997; Levy, 1997, 1999), there have been relatively few published works on the design of an overall web development scheme. Guidelines proposed in the literature on the development of computer assisted language learning (CALL) software were also considered for developing WPC. By adopting Keith and Lafford (1989)'s general framework for the development process of vocational language programme software, three key phases in the development process were articulated. They are, namely a pre-design phase for drawing up a development plan, a design phase for producing the planned contents, and a post-design phase for evaluation and using it. Details for each stage are depicted in figure 1.

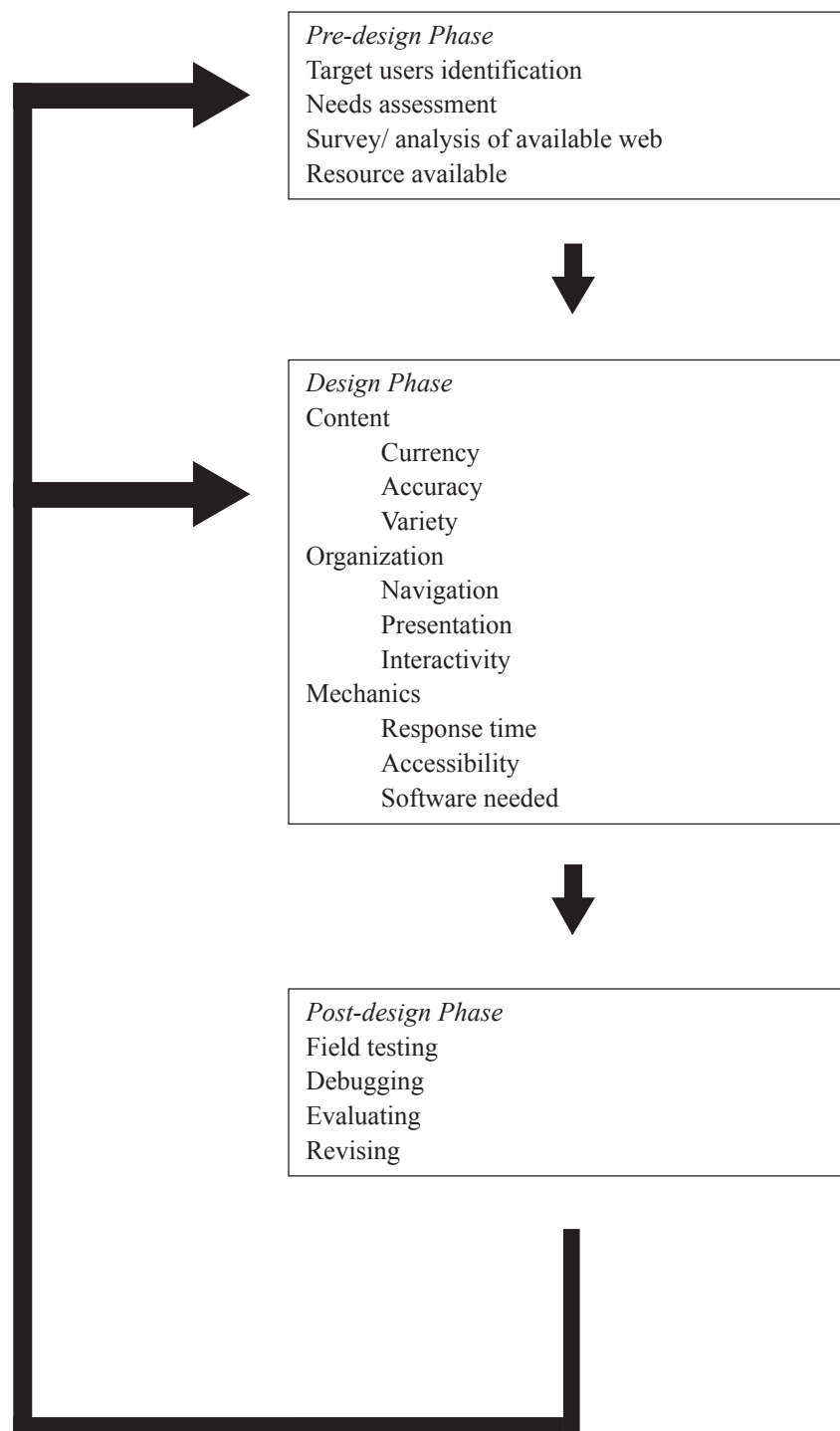


Figure 1. Web development process

Pre-design phase

The target users of the web to be developed were already defined at the beginning. The establishment of the web was initiated by an observation that students pursuing language enhancement and business communication courses need further input and references concerning workplace communication. The observation was confirmed through detailed discussion in meetings with tutors and students of the courses. The target learners to be served are therefore students of such courses at the institution, all of whom are adults. To determine what the

students need, one first task of the pre-design phase was a needs assessment survey. A total of 29 students participated in it. Its major results are summarized here.

The mode of support, or how the web is to serve them, was the first area examined. The extent to which the World Wide Web (WWW) may serve students' learning can be considered in a continuum between minimal use of the web and employing the WWW for all aspects of the general information. Harmon and Jones (1999) classify the learning application of the WWW into five levels. Table 1 shows the five levels in such a continuum.

Table 1 Levels of using the WWW for teaching/learning (Harmon & Jones, 1999)

Minimal use of WWW	Level 1 - Information Web Use
	Providing administrative information
	Level 2 - Supplemental Web Use
	Providing course content information (which is not essential to the course)
	Level 3 - Essential Web Use
	Providing most of the course content information
	Level 4 - Communal Web Use
	Serving as an interactive platform for communication between instructors and students
Full use of WWW	Level 5 - Immersive Web Use
	Doing all teaching, learning and administrative activities through the web

During the survey, participants were invited to express their views through semi-structured questions on the web support they need. They were guided to indicate the level of web use they would prefer. The results of the survey are summarized in Table 2. As the table shows, 75.7% of the participants indicated that they favoured a web providing Level 2 support. In other words, they wished the web to serve a supplemental role rather than

an essential role. This was understandable as they already had a set of formal study material covering the course content comprehensively, so there was no need for them to obtain course material through another means unless they wished to have an electronic version of the material. Among those who preferred Level 2, 36.3% also expressed their worries about the potential technical problems of obtaining material through the WWW, such as long

download time, the need to purchase extra software, and the poor quality of the downloaded version. In addition, 54.5% of them said that they preferred not to have communication with tutors and coursemates through the Internet as a formal, or compulsory, part of the course. These could partially explain why they did not prefer a

higher level use of the web. Such a tendency not to make a high level use of the web is in fact not uncommon. Fitzelle and Trochim (1996), for example, also found that students did not wish to participate in the bulletin board activities and did not welcome substituting an electronic text on the web for a hardcopy.

Table 2 Levels of using the web (c.f. Harmon & Jones, 1999)

Mode of using the web:	I (a respondent)prefer it to be:	Respondents preferring the mode of support percentage (frequency)
Level 1 - Information web use	a web that provides administrative information only.	6.8%(2)
Level 2 - Supplemental web use	a web through which I obtain supplementary reference material to enrich my knowledge about workplace communication.	75.7%(22)
Level 3 - Essential web use	a web through which I obtain my course's study material on workplace communication.	13.8%(4)
Level 4 - Communal web use	a web through which I interact with my tutors and fellow students.	0.0%(0)
Level 5 - Immersive web use	a web through which I complete almost all learning activities and interact with tutors and fellow students.	3.4%(1)

When asked about the advantages of providing such support in the form of webpages, two factors appeared salient among the participants: easy accessibility and autonomy. A total of 51.7% of the participants mentioned the former factor and 31.0% of them pointed out the latter. One participant said:

“If the material is on webpages, it will be only a few clicks away and we may access it at the time convenient to us. When we surf the web, we pick pages in different ways and spend different lengths of time on different pages. For

reference material, we must be able to choose freely what to read and what to skip...”

This highlighted the need to allow adult students to go about their learning individually, a point which has been well supported by relevant research (e.g. Brundage & MacKeracher, 1980; Garland, 1994).

For the content of the web, the participants of the survey were requested to name the content areas they would prefer the web to provide. The most frequently mentioned areas are shown in Table 3.

Table 3 Most Frequently Mentioned Content Areas

Document samples	Document templates	Useful expressions	Exercises
82.7%(24)	58.6%(17)	51.7%(15)	37.9%(11)
Grammar	Principles about using specific document types	General communication theory	Common errors
37.9%(11)	34.4%(10)	27.6%(8)	27.6%(8)
Hyperlinks	Vocabulary	Principles of speaking in various contexts	Guidelines/ explanations
24.1%(7)	24.1%(7)	20.7%(6)	17.2%(5)

These can be grouped under two categories, the first being subject matter areas of workplace communication and the second the nature of the material. The first category includes writing documents, speaking at work, principles of workplace communication (comprising both theories and strategies), grammar and vocabulary. This area category is in line with research on the content design

of business communication courses (Plutsky, 1996; Maes et al., 1997; Reinsch & Shelby, 1997; Wardrope & Bayless, 1999). The second category is concerned with the nature of the information that the participants expect. Using these categories, a web content matrix like Table 4 was constructed.

Table 4 Learners' Expected Content of the Web

Content	Nature of material to provide			
	Guidelines	Samples	Exercises	Hyperlinks
Principles/strategies				
Diction				
Grammar				
Writing documents				
Speaking at work				

Having determined the needs of the target learners, careful consideration was given to the impact of the expected web on student learning to make sure that it justified the additional resources required for its establishment. This step was necessary for ensuring that the web development project was using effectively the substantial resources required (Kemp et al., 1998; Welsh, 1998). This step is less relevant to web-based language learning, so its details are skipped here.

Web development is in general costly in terms of money and manpower. Web support for language learning should be established only when there are sound reasons to do so. There are a large number of language webs available for free access. It should be wise and cost effective to make good use of the existing resources. Therefore, the next step was to determine the availability of webs that provide content that the target learners need. If such content was widely available, there was no need

to reinvent the wheel and repeat it, and the learners could just be referred to the relevant webs.

English language learning webs established by other tertiary institutions and relevant organizations in Hong Kong (named as A-J) were visited and evaluated for their relevance in terms of level and scope of content. The institutions were:

- A Independent Learning Centre, The Chinese University of Hong Kong
- B English Language Centre, The City University of Hong Kong
- C Language Centre, Hong Kong Baptist University
- D English Centre, The University of Hong Kong
- E Virtual English Centre, The University of Hong Kong
- F Language Centre, The Hong Kong University of Science and Technology

- G English Language Education and Assessment Centre, Lingnan University
- H English Language Centre, Hong Kong Polytechnic University
- I Virtual Language Centre, Hong Kong Polytechnic University
- J English Language Centre, Hong Kong Institute of Education

There had been little similar research related to how contents of language learning webs are compared. Given the lack of an analysis framework for reference, the framework of Table 4 was adopted for an exploratory comparison. Their site contents are first summarized in the framework and are then compared. A summary of the results is presented in Table 5.

Table 5 Summary Results of Comparisons of English Language Webs

Content	Nature of material to provide			
	Guidelines	Samples	Exercises	Hyperlinks
Principles/strategies				
Diction	BDI	BDI	DEI	AEFGH
Grammar	HI	HI	BCEHI	ABEFGH
Writing documents	DFHI	DFH	DEFHI	ABDEFGHJ
Speaking at work	DFH	ADFHI	DFH	ADEFGJ
Interactive communication	ABCDEFHI			
Other useful links	ABCDEFGHJ			

Note: Letters A - J referred to learner support available in each of the webs, established by the ten tertiary institutions.

The webs examined were all established by tertiary institutions in Hong Kong. The analysis suggested that, although the webs had rich contents, they tended to be on general English language learning and possessed a limited coverage of workplace communication. There seemed to be a heavy orientation towards language form, especially that of the grammar areas. There was little information on other areas that workplace communication stresses,

such as building goodwill, adapting message to specific audience and enhancing the readability of writing (c.f. Locker, 2000). In addition, the sites on workplace documents provided few text samples of authentic communication and they lacked detailed workplace document templates. The genres covered were mostly limited to letters (especially job application letters), resumes, reports and proposals. In most webs, the

information relating to speaking at work was mainly about job interviews and telephoning. There were no webs covering principles of communication. The general lack of information addressing learning needs of workplace communication was in fact not surprising as the webs are established by local institutions for supporting language learning. Though they provided rich and useful resources, they were not designed for workplace communication education specifically. So there was an urgent need to establish a web for workplace education.

Design phase

Based on the information obtained in the pre-design phase, the web development work proceeded to the design phase in which webpages were written and published onto the designated server. In this phase, three areas were considered, namely *content*, *organisation*, and *webpage mechanics*. As reflected in criteria generally employed for web evaluation, these three areas are central to the effectiveness of a web (Wilkinson et al., 1997; Tweddle et al., 1998).

Content is the key element of a web. It is often the most important area that users are requested to look at when evaluating the usefulness and suitability of a web (Symons, 1997). The coverage of the WPC content has been defined in the pre-design phase. Three other aspects were considered at this stage. One aspect was currency, which is an essential aspect of content (Weston et al., 1999). Wherever possible, the content of the WPC was made relevant to the local needs of target users and rendered up-to-date. One effect of taking this aspect into consideration was that over 300 business correspondence samples were rewritten and adapted from real documents collected from companies, with confidential information

removed to avoid disclosure of the sources. Accuracy is another important aspect. This is concerned with not only the effectiveness of the web's service, but also the credibility of the web. A stringent proofreading process was followed. For example, each webpage of the WPC went through a multiple-step quality control process before publishing: planning - developing - proofreading - revising - proofreading - publishing, and was then proofread by at least three experts in the field. Variety was the third aspect to consider under this area. Martinez (2000) cautions online learning resources developers against having only one type of learners in mind when designing these resources, as this will only frustrate the users and limit their success in using the resources. Good webs should use multiple ways to provide information. To fit different learning styles of students, the WPC adopted various approaches to instructional designs. For example, when introducing a written genre, explanations, samples and exercises were included, in addition to a template of the particular genre. An overview of the content coverage is illustrated in Appendix 1.

Organisation, the second key area, refers to how information is organized in a web. It plays a decisive role in judging the effectiveness of a web (Tweddle et al., 1998). In this area, the first factor to consider for organization was navigation within the web site, which dealt with how easy the users would find it to explore the documents. To ensure that the users could surf the web easily, attention was given to the organizational structure of the site including headings, subheadings, index, table of contents, and menu design as these were integral parts of the instructional design (Dick & Carey, 1996; Smith & Ragan, 1999). In the WPC, to enable visiting students to know what they could get from the site, a scrolling

window was employed to highlight special features, and cross referencing links were provided for the users to jump from one page to another relevant one. Presentation, another factor considered under organization, dealt with the physical attributes of the site, such as font size, colour, animation, and graphics. These physical attributes should be used appropriately and accurately; if not, it would hinder communication (McFarland, 1995; Duglin, 2000). With effective presentation, these attributes should promote a consistent style and enhance the users' reading and understanding of the information. The third factor was the interactivity involved. Interactivity was one of the most important features of online resources (Weston et al., 1999). However, as noted in the pre-design phase, students tended not to prefer any compulsory use of the web. The ones who would like to interact with other fellow coursemates were encouraged through features such as bulletin board, discussion forum and FAQs.

Mechanics, the third key area, refers to the extent to which the hardware and software involved are user-friendly. Key issues to consider in this area include the mechanical response time of the web, the extent to which it is easily accessible on the Internet and the need for specific software to view its pages (Symons, 1997; Tweddle et al., 1998; Hager, Kibler & Zack, 1999). The response time must be short enough so as not to discourage visitors from browsing the web. The accessibility of the site, especially when the traffic is heavy, is also a critical factor for whether or not the web provides its services. In general the fewer software requirements there are for surfing the web, the more likely its services can be enjoyed by students. To ensure easy accessibility, it was decided that the WPC would not require its users to install any software (in addition to the web browser) so as to

encourage visits to the site.

Post-design phase

The report on the post-design phase has to be limited since the website has been launched very recently. Tasks to be completed in this phase included field testing, debugging, evaluating and revising. The first two tasks were to ensure that the web could operate and offer its services. Evaluation provided information about the extent to which the web could effectively serve its purposes and meet the needs of its target users. The revising task was to improve the web as a result of the evaluation.

The WPC has been launched, and work for field testing and debugging has been completed (not to be elaborated here for not being related to academic work). Some preliminary evaluation work has been done, including a survey through a brief questionnaire and a statistical analysis of the hit rates in the test period of the web.

The short questionnaire was created to gather quickly available information for rectifying any site problems. Its major results are listed in Table 6.

Table 6 Summary Results of Questionnaire Survey on the WPC

<i>Purpose</i>							
Aims have been clearly stated?	Yes 97.6% (83)			No 2.4% (2)			
Can the site achieve them?	95.3% (81)			4.7% (4)			
<i>General Appearance</i>							
Are the pages attractive?	Yes 65.9% (56)			No 34.1% (29)			
Strengths	Colours 36.5% (31)			Layout 63.5% (54)			
Weaknesses	Colours 34.1% (29)		Layout 4.7% (4)		Graphics 36.5% (31)		Wordiness 24.7% (21)
<i>Usefulness</i>							
Help you learn workplace communication?	Yes 92.9% (79)			No 7.1% (6)			
	All	Written	Spoken	Language Aid	Com. Theory	Interactive Zone	Useful Link
Most useful part	8.2% (7)	20% (17)	31.8% (27)	29.4% (25)	1.2% (1)	1.2% (1)	8.2% (7)
<i>Depth</i>							
Information detailed enough?	Yes 82.4% (70)			No 17.6% (15)			
<i>Commendable Features</i>							
Layout	Comprehensiveness	In-depth	Usefulness		Understanding	Instructional design	
14.1% (12)	31.8% (27)	12.9% (11)	30.6% (26)		3.5% (3)	7.1% (6)	
<i>Missing Parts</i>							
Audio features	Exercises		Genuine examples		Pronunciation		Tense
51.8% (44)	23.5% (20)		11.8% (10)		9.4% (8)		3.5% (3)
<i>Overall Rank</i> (1 - lowest; 5 - highest)							
1	2	3		4		5	
0.0% (0)	5.9% (5)	31.8% (27)		60.0% (51)		2.3% (2)	

A total of 85 students participated in the survey. The first area of survey questions was concerned with the aims of the web. It first asked students whether the web's aims had been made clear, and then asked them whether the web had achieved its aims. This first part was considered important because students must know the objectives so as to properly evaluate it.

The second area of questions dealt with the layout design of the web. As shown, 34.1% of the respondents stated that the pages of the WPC were not attractive.

Among the weaknesses cited, general appearance seemed to be the major problem of the WPC. Graphics and colours were the most problematic aspects concerning the general appearance - and, as a result of this, the web layout was redesigned. Also, 24.7% commented that the WPC looked "too wordy". Though this remark was not from the majority of the respondents, action was considered necessary as web surfers might not be prepared to read paragraph after paragraph on screen when surfing the WWW. As a result, relatively long paragraphs in the

theory and guideline parts of the web were transformed into bullet points.

The WPC was considered to offer useful support to their learning of workplace language use. A total of 92.9% responded that the WPC could provide such assistance. The most useful parts of the web were found to be “Written Communication”, “Spoken Communication” and “Language Learning Aids”. Also, 82.4% responded that the information in the WPC was already detailed enough.

Among the commendable features mentioned, comprehensiveness was ranked first (31.8%). The second rank went to its usefulness (30.6%).

When asked what features they thought were missing from the web, 51.8% pointed out audio components. As the production of audio clips involves a substantial budget, improvement work in this respect would be considered in its next stage of development, rather than the present one.

The participants were finally requested to give a mark to the web on a five-point Likert scale, “1” being the

lowest rating and “5” being the highest. A total of 62.4% gave 4 marks or above, which showed that the standard of the WPC was above average and to their satisfaction.

These results were consistent with the hit rate statistics of the web. In it, a hit count was the request for a webpage of the site to the server, or a visit to a webpage, by a WWW end user. The site components receiving the highest hit rates are shown in Table 7. These hit rates agreed only partially with the popularity of the content areas as reflected in Table 3. As noted in Table 3, “document samples” and “document templates” were most popular contents expected by the target students. This matched well with the high hit rate for the “Written Communication” part of the web. However, the high popularity of several other content types - such as “useful expressions” and “grammar” that are in “Language Learning Aids” - was not reflected in the hit rate. Further analysis would be needed to identify the reasons behind this finding.

Table 7 Hit Rate of the WPC

Component	Overall hit rate
Understanding Communication	2,506
Written Communication	13,780
Spoken Communication	3,891
Language Learning Aid	1,628
Interactive Zone	328
Useful Links	855
Total	22,988

Note: In the web's first two months of operation

In addition, knowledge management techniques (such as knowledge creation and sourcing, knowledge compilation and transformation, knowledge dissemination and knowledge application in Liebowitz, 1999) on WPC

appear applicable for interpreting the web-surfing behaviours. Four types of corresponding exemplified features in socio-cognitive domains of its users can be articulated as follows.

Table 8 4-tier functions of knowledge management and corresponding socio-cognitive features of WPC users

4-tier functions of knowledge management	Corresponding exemplified socio-cognitive features of WPC users
Knowledge creation and sourcing	Identification of WPC main areas by quickly glancing through interesting areas or visiting site map and then sorting out exemplars or attractive templates for language learning
Knowledge compilation & transformation	Systematic filtering of useful exemplars through repetitive learning times
Knowledge dissemination	Extension of existing knowledge to other drilling exercises and paying attention to some syntactical or semantic errors, subject to users' cognitive levels
Knowledge application & value realisation	Further application of existing knowledge to other workplace contexts by enriching vocabulary, and deepening learning contexts by scrutinising other web links

Discussion

For further enhancement of WPC's functions, to facilitate its users' learning (or in their knowledge creation and co-construction), there is plenty of room for improvement. At present, most functions of WPC utilize the content-oriented model in computer-mediated technology (CMT), based on cognitivist assumptions whereas only its "interactive zone" looks for online collaborative distance learning under the newly evolved knowledge-construction model under socio-constructivist learning paradigm. Preliminary analysis of the top 19 WPC users' click-in

icons and time duration at the time of writing this paper revealed two salient features. Firstly, three stages occurred successively during each user's visiting time. Secondly, the less frequent the users browsed through the web pages, the more frequent would be the short stay times (e.g. less than 1 minute). Notably, composed of three main stages, a hypothesised conceptual model accounting for WPC users' knowledge management process is tentatively depicted in Figure 2. Ongoing qualitative analysis of socio-cognitive gains for future users of WPC will be carried out to corroborate such model in the near future.

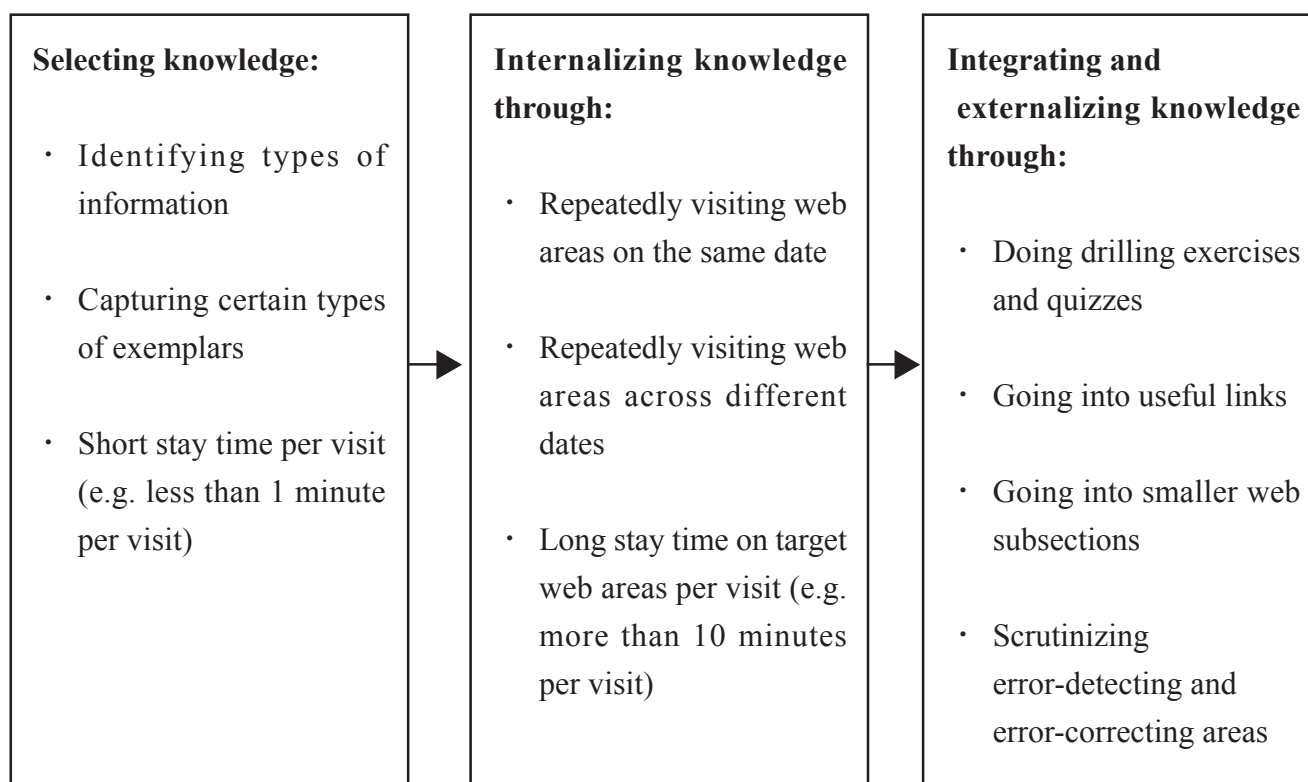


Figure 2. Three main knowledge management stages for WPC users

Conclusion

There is probably no universal blueprint for learner support or any ideal for online learning / teaching materials (Carr-Chellman & Duchastel, 2000; Tait, 2000). This paper offers a web development scheme that has been implemented and found workable. Many factors need to be considered in the development process of knowledge management, and this paper has highlighted the key ones in the light of past working experiences and proposed future directions.

While there is an irreversible general trend for more and more courses and learning support to go online, education providers should probably not put

priority on how to save costs but rather on how to make the strategic shift to online delivery without appreciably increasing costs, as Inglis (1999) points out. The web analysis in the pre-design phase helps to make the shift smooth, by identifying resources already available on the WWW and avoiding duplication of this material. This also highlights the strategic value of collaboration between institutions. Sharing of such strategic developmental process is a fruitful lesson for the establishment of similar webs for workplace or distance education. The development of learning / teaching materials is usually a continuing process without an end point (See Figure 1).

Endnotes

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Appendix 1

Content Map of the World of Professional Communication (WPC)

