

Learning strategies used by Second Language students in accessing online resources

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Abstract: After Oxford's pioneering work, the strategies used in learning language, and in second language acquisition in particular, have been found to be important. The relative roles the L1 and target L2 play are now being researched, and how these vary with L2 ability. But although ubiquitous computing is rapidly emerging, not much research attention has been paid to the language learning strategies actually used in accessing online resources. A variety of theoretical publications, notably those of Prensky, and of Warschauer, postulate that significant qualitative differences exist between traditional and online learners and learning. In this literature review I therefore consider four papers that illustrate the qualitative transition in second language learning from traditional to electronic communicative networking. I then identify the potential for empirical research into online learning language strategies that are used by students to complement traditional L2 learning, which I suggest can be simply addressed by subjecting the theoretical schema now being advanced to empirical research of the kind performed in the papers reviewed. Notably this would include conducting think-aloud protocols together with interviews and subsequent analysis. Research should exploit the computer-based Internet environment, and focus on patterns of L1:L2 usage, and their variation with L2 aptitude. In particular, I propose specific research questions: Are connected/collaborative learning strategies and cognitive styles evident in online L2 learning? Do online LLS show increased active participation and autonomous interaction? Are new metacognitive LLS appearing that favour nonlinear cognitive behaviour? And what relationships obtain between traditional and online LLS?

Keywords: online, L2, SLA, e-learning, LLS, language learning strategies, CALL.

1. Introduction

Following Oxford [1], language learning strategies have been recognized as being of considerable importance in first and second language acquisition, where they enhance students' own learning, and are used for the active self-directed involvement considered essential for developing communicative competence. The roles the student's L1 and L2 play in L2 reading strategies are now being addressed, together with how these vary with L2 proficiency. Meanwhile, the ICT revolution is seeing the emergence of ubiquitous computing. In Korea, nearly all language students have access outside class to the Internet. As I elsewhere describe [2], many already use personal electronic dictionaries/translators in class, and these are now being included in cell phones that have become an almost-universal accessory. Language teachers are embracing computer-aided teaching and learning, and dedicated Computer-Aided Language Learning (CALL) is also becoming widespread.

However, not much research has been conducted into the role of language learning strategies used in accessing online resources, though a confirmation of the topicality of this area to applied linguistics research is the recent invitational [Conference on Technology for Second Language Learning](#) that focused on Learner Strategies in CALL, which was held September 2006 at Iowa State University. To my reading, published experimental research has assumed traditional forms of language learning strategies, which are then projected onto online use. This contrasts with significant theoretical explorations that identify the qualitative difference between traditional learning and the online learning of those Prensky terms Digital Natives, who grew up with digital technology from birth, whereas his Digital Immigrants were already socialized in predigital ways when digital technology arrived on the scene. Digital natives think and process information fundamentally differently from their predecessors [3], and adopt a short-burst, casual, multitasking style [4].

Table 1: Prensky's [5] comparison of learning strategies and cognitive styles

Digital Immigrant	Digital Native
<i>Conventional speed</i>	<i>Twitch speed</i>
<i>Linear processing</i>	<i>Parallel processing</i>
<i>Linear thinking</i>	<i>Random access</i>
<i>Text first</i>	<i>Graphics first</i>
<i>Standalone</i>	<i>Connected</i>
<i>Passive</i>	<i>Active</i>
<i>Work</i>	<i>Play</i>
<i>Patience</i>	<i>Payoff</i>
<i>Reality</i>	<i>Fantasy</i>
<i>Technology as foe</i>	<i>Technology as friend</i>

Ferris and Wilder [6] observe that electronic learning environments such as Wikis are introducing a secondary orality in education that favours the resurgence of pre-literate oral characteristics of collaborative ownership of knowledge. Educators therefore need to recognise the imperative for new paradigms that help students gain the information literacy skills necessary to differentiate and make their own judgments of accuracy of information.

Warschauer has written prolifically of the digital divide, and observes that computers and the Internet have enabled many types of classroom or distant interaction that simply could not have occurred previously [7]. Elsewhere [8], Shetzer and Warschauer raise the question: in developing an electronic literacy approach in EFL, what strategies for communicative networking should students be taught? They summarise key differences as:

Table 2: Shetzer and Warschauer's comparison of learning strategies and cognitive styles

Comparison of Language and Literacy Instruction	Earlier approaches to language and literacy instruction	Electronic literacy approach to language and literacy instruction
Communication	<i>Based on speaking and listening</i>	<i>Also includes computer-mediated communication</i>
Construction	<i>Based on linear texts</i>	<i>Also includes hypertexts</i>
	<i>Excludes non-print media</i>	<i>Combines texts and other media</i>
	<i>Tends to focus on individual writing</i>	<i>Strong focus on collaboration</i>
Reading & Research	<i>Restricted to print sources</i>	<i>Includes online sources</i>
	<i>Focuses on linear texts</i>	<i>Also includes hypertexts</i>
	<i>Excludes non-print media</i>	<i>Combines texts and other media</i>
	<i>Tends to separate reading skills from critical evaluation skills</i>	<i>Views critical evaluation as central to reading</i>
	<i>Focuses on library search skills</i>	<i>Includes searching and navigating online sources</i>
Learning Paradigm	<i>Often based on curricular learning paradigm</i>	<i>Based on interactive learning paradigm, with emphasis on autonomous learning</i>

I review four papers that illustrate this qualitative transition. Feng and Mokhtari [9], in *Reading Easy and Difficult Texts in English and Chinese: Strategy Use by Native Speakers of Chinese*, determine that reading strategies are more often used in the L2, and for more difficult texts. Upton [10], in *First and Second*

Language Use in Reading Comprehension Strategies of Japanese ESL Students, finds that the language L2 readers use to think about and process an L2 text corresponds to their language proficiency, with less proficient readers relying more on their L1. Chun [11], in *L2 Reading on the Web: Strategies for Accessing*

Information in Hypermedia, obtains insights into how L2 learners use online textual and audio information to aid reading comprehension. Finally, Gallo-Crail and Zerwekh [12], in *Language learning and the Internet: Student strategies in vocabulary acquisition*, recognise that strategy use is important in language learning, especially of vocabulary, and that employing a diversity of strategies is beneficial.

I then identify the potential for empirical research into the language learning strategies L2 students might employ (within or outside class) in accessing supplemental online resources (primarily Internet-based) in the course of traditional classroom-based second language learning, where instruction is not primarily computer-based. Online language learning strategies are likely to be qualitatively different from traditional strategies, and research attention should be paid to these new strategies and to their relationship to those traditionally employed.

2 Analyses

Feng and Mokhtari investigate the reading strategies native speakers of Chinese, fluent in English, use while reading easy and difficult texts in both English and Chinese. Think-aloud data, limited to the language of the specific text for consistency, were analysed to determine whether strategy use varied with individual differences or with text difficulty.

Noting that L2 reading is not a monolingual event, Upton addresses the roles the L1 and L2 play in L2 reading strategies, and how these roles vary with L2 proficiency. Japanese native speakers performed think-aloud protocols in the language of their thoughts while reading English texts. In retrospective interviews, subjects listened to their think-aloud protocols and clarified their thoughts.

Chun explores how American students, fluent in English, elect to access information while reading L2 German texts in a Web-based learning environment. The use of online multimedia support resources was tracked; students wrote summaries of texts, which were scored. Some students did think-aloud protocols while reading online. Selected students were retrospectively interviewed about their metacognitive reading strategies.

The case study of Gallo-Crail and Zerwekh addresses the learning strategies used by American students to acquire new Tagalog/Filipino L2 vocabulary, to determine which strategies facilitate longer retention, depth of word knowledge, and appropriate word use. They explore the implications for vocabulary pedagogy in the classroom, when the medium of instruction is in part the Internet.

3 Evaluations

Method: Participants

Care was taken to verify that **Feng and Mokhtari's** twenty native speakers of Chinese were proficient in Chinese and English. Subjects were studying or working in the United States at the time of the study, and held college degrees from China. **Upton's** eleven native speakers of Japanese residing in the United States were divided into two proficiency groups, depending upon their length of residence, and their TOEFL scores. **Chun's** twenty-three Californian university students were fluent in English, enrolled in second-year German, and comfortable with computers and the Web; they also were divided into two L2 ability groups. **Gallo-Crail and Zerwekh's** twenty Illinois college students (including six Filipino-Americans), at the beginning level of learning Tagalog/Filipino as a foreign language, were clustered into two groups according to their SILL Questionnaire scores. As with Chun's study, an oversight is not stating whether the subjects were native English speakers.

Method: Materials

Feng and Mokhtari's materials consisted of 150-200 word easy and 250-300 word difficult expository passages in English and Chinese. These were typical of American basal readers, of 7th and 12th grade readability respectively, and on familiar topics to control for prior knowledge effects. The texts are well described, and samples appended. However the Chinese text is unreadable, indicating a pdf document with embedded fonts should have been posted. Red dots were inserted every one or two sentences to visually prompt subjects to think-aloud, as with **Upton's** 231 word passage; his single text is only briefly described but might profitably have been included. **Chun's** hypertext materials are thoroughly documented, illustrated, and have their text appended. **Gallo-Crail and Zerwekh's** imaginative materials revolved around classroom activities that demonstrated the different strategies investigated; sample activities included telephone relay, Pictionary, role-playing, charade, a concentration game and short cultural narratives. Exercises are described and illustrated with too-small screenshots. Disappointingly, appendices including questionnaires have unexpectedly been truncated from the pdf.

Method: Procedures and Analyses

Feng and Mokhtari's think-aloud protocols were conducted in accordance with established procedures, and taped for accurate transcription and data analysis. Subjects were briefed about the study purpose, and trained to think-aloud while reading. Instructions were intentionally kept neutral; after practice sessions a question-and-answer session was conducted. All data collection techniques were conducted within a few days of the practice sessions, with subjects first reminded of the think-aloud procedure, and researchers available to answer questions. The subjects chose whether to read first in Chinese or in English.

The protocol transcripts were then read and the parts containing strategies marked. Judges then identified and categorized them, compared their findings and generated lists of strategies, in which they attained a high degree of agreement.

While providing thorough documentation, in focusing on the number and types of learning strategies used, the authors only briefly consider how effectively subjects use those strategies, or how appropriate a strategy employed is to the task at hand.

Upton's subjects were also trained; then instructed to verbalize what they were thinking about and doing as they read, in the L1 or L2 they were then thinking. Think-aloud protocols were taped. On completion, subjects were immediately asked to listen to their taped comments and interviewed in Japanese, being asked to explain what they were doing while reading, and what language they had been thinking in.

Think-aloud protocols were analysed, using Block's classification scheme of reading comprehension strategies used by ESL students for analysis. Attention was paid to the reported language in which the strategy was employed. Both protocols and retrospective interviews were translated and transcribed completely into English, with the interviews being used to verify the results.

Upton's study presents numerous examples of protocols and interviews, and thoughtfully discusses them. He provides a valuable contribution towards understanding the language of thought used by L2 learners in comprehending texts, reinforcing the significance of access to the L1 and its use as a strategy to help comprehend L2 text.

Chun's subjects used computers to read two texts at their own pace, and perform the accompanying exercise of writing a summary in English of everything they could remember about each text. While reading Text 1, they could firstly look up unfamiliar words by either simply clicking a glossed word marked in blue from the internal glossary, or by consulting an online German-English external dictionary, where they had to

highlight the word, click the dictionary icon, then chose the appropriate translation. (Chun gives conflicting accounts, elsewhere repeatedly describing this process as one of either coping and pasting the word, or typing it, into the dictionary. In view of her research question concerning preferences regarding the relative ease with which information could be accessed, this oversight is not insignificant.) Secondly, they could listen to a native text narration, by clicking an audio icon. While reading Text 2, they only had access to the online German-English dictionary. They then had to provide a written English summary of everything they could remember.

Independent raters scored the number of pre-determined propositions that were recalled by subjects, with high reliability. Navigation within the program and the words looked up were recorded by tracker software, enabling the time spent on task to be determined together with the number of times audio narration was used and which words were looked up in either the glossary or dictionary. Mouse clicks were recorded and time-stamped. Think-alouds while reading of four students were recorded, they being asked to explain each action they were taking, what was going through their minds, and how useful they found different program features. Seven subjects were retrospectively interviewed regarding: their level of computer experience, Web familiarity, reading and listening processes, and problems encountered; what thoughts they had about looking up words in the glossary versus the online dictionary versus a paper dictionary; whether reading the texts online was different from reading a hardcopy; and whether the audio narration was helpful.

Chun's study is particularly helpful in focusing on the role individual differences play both in learner responses to hypermedia, and in think-aloud protocols; and is a timely reminder of the mixed results obtained in second language acquisition research regarding the effectiveness of hypermedia-enhanced environments.

Over one semester, **Gallo-Crail and Zerwekh's** subjects spent one day a week on audio and computer-based Internet activities, and four days a week on classroom activities that included material demonstrating the different strategies studied. Subjects visited the www.seasite.niu.edu website, and selected a strategy-based activity. Vocabulary lessons were presented with Web-based activities that supported various strategies. Prior instruction on using these activities was demonstrated, and additional instruction was available online.

Subjects recorded weekly activities on an accountability chart, indicating the strategies used at home and on the Internet, time spent per strategy, and preferred classroom activities. This chart was used for teacher-student conferences, and to keep track of the ways in which they studied vocabulary items and the amount of time spent in doing so. Data collection also included online strategy surveys, weekly online and email quizzes, and classroom observation. Descriptive statistics provided a quantitative analysis of the data.

In my opinion, Gallo-Crail and Zerwekh study is too ambitious. Their account of data collection and analysis, though rich, appears confused, reflecting the excessive diversity of the tasks students were set; there are many extraneous variables that might have biased the data. Nevertheless I find their Web-based activities

(mainly Java applets, which provide considerable interactivity) to be of significant interest. These may be seen at http://www.seasite.niu.edu/using_seasite.htm.

They suggest obvious applications to other L2s, and I suggest software templates could be offered that readily facilitated such multilingual use. The applets could be used for a variety of EFLs, simply by providing an English interface to paste in L1 data. Pertinent observations they make are that most studies to date have not used computer-based or Internet-based assessment tools; and that using a variety of learning strategies in language learning contributes to language achievement, which has important implications for instructional design, particularly for Internet-presented material.

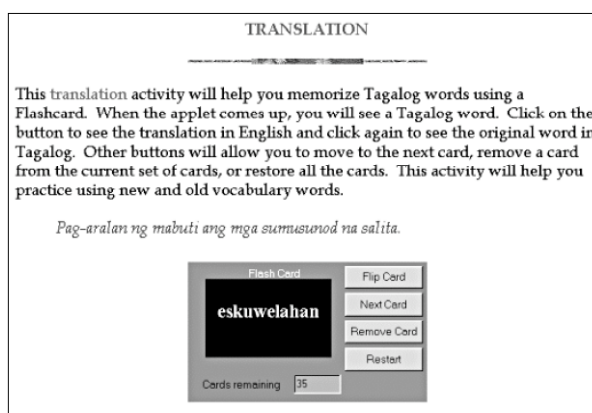
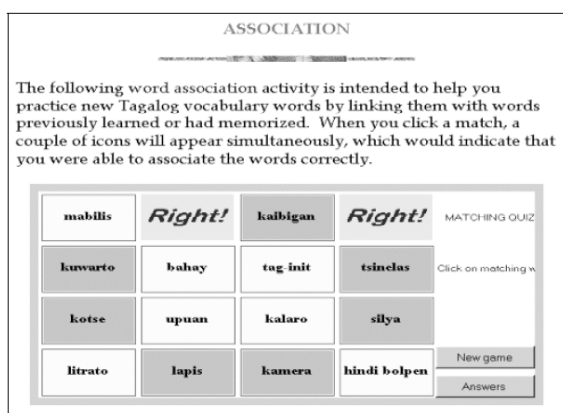


Figure 1: Gallo-Crail and Zerwekh's Java-based word matching and flashcard exercises.

All studies use relatively small groups of subjects, and therefore care should be taken in generalizing from the results, particularly as several studies identify the significance of individual differences. However they also report their results tend to be in agreement with other research, and are supported through triangulation by using multiple methods of data collection and analysis; further, Gallo-Crail and Zerwekh's research extends over an entire semester. Upton's, Chun's, and Gallo-Crail and Zerwekh's subjects are divided into two groups on the basis of L2 aptitude (loosely speaking). Feng and Mokhtari, and Upton employ texts of different ability. While Feng and Mokhtari, Chun, and Gallo-Crail and Zerwekh make use of bilingual material, Upton provides just L2 material. Feng and Mokhtari, Upton, and Chun all make use of taped think-alouds.

Feng and Mokhtari restrict the think-aloud language to that of the text for consistency, while Upton allows his subjects to use the language in which they are then thinking, and Chun utilizes L1 think-alongs (presumably, in that he does not specify the language used in think-alongs or in retrospective interviews; I presume it to be the L1), and has subjects make written summaries in their L1. While Feng and Mokhtari do not interview their subjects, Upton's, Chun's (presumably), and Gallo-Crail and Zerwekh's subjects are interviewed in their L1. While neither Feng and Mokhtari or Upton have their students use computers, Chun utilizes computer-based reading with limited online supplemental resources, and Gallo-Crail and Zerwekh make extensive use of computer-based Internet activities that complement traditional classroom activities.

4 Conclusion:

I have discussed a significant number of theoretical explorations being published that, while not containing empirical experimental evidence, maintain that online Internet-based language learning is qualitatively different from traditional learning, and calls for different language learning strategies. I propose that significant implications for LLS research may be deduced simply by subjecting the schema of Prensky and of Shetzer and Warschauer (of Tables 1 and 2 above), to experimental research of the kind performed in the four papers reviewed. Think-aloud protocols together with retrospective interviews would be conducted, and analysed by judges, in combination with other modes of data collection for triangulation. The computer-based Internet environment used by students to access supplemental L2 resources would be exploited to present material, and to readily track, capture and analyse data. Attention would focus on patterns of L1:L2 usage, and their variation with L2 aptitude.

Within these experimental parameters, certain research questions are now proposed, which I intend to fully develop in a subsequent paper:

- The schemas identify connected/collaborative learning strategies and cognitive styles; but are such strategies actually evident in L2 student online use of resources? e.g. students frequently use SMS and email, but are they spontaneously employing them as L2 learning resources?
- A second area of agreement between the two schemas concerns the dichotomies of Active/Passive and Interactive-Autonomous/Curricula-based learning. But do language learning strategies used in online accessing of resources actually show more active participation and autonomous interaction than with traditional LLSs? For example do students discover and employ new Internet resources for L2 learning of their own volition?
- A third area of consensus lies in the dichotomies of Parallel processing/Linear processing, Random access/Linear thinking, and Hypertext/Linear text focus approaches to Construction, Reading and Research. Do empirical studies actually reveal new metacognitive language learning strategies being evolved that favour nonlinear cognitive behaviour? If so, are the relationships between the L1 and L2 becoming more complex, allowing more effective L2 learning, but raising the danger of cognitive overload?
- Finally, the authors reviewed speculate on the transfer of L1 to L2 learning strategies. What relationships obtain between the language learning strategies of traditional learning and those of online Internet-based learning? Is there simple transference from old to new; and is there perhaps retro-transference, where new learning strategies revitalise the old?

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