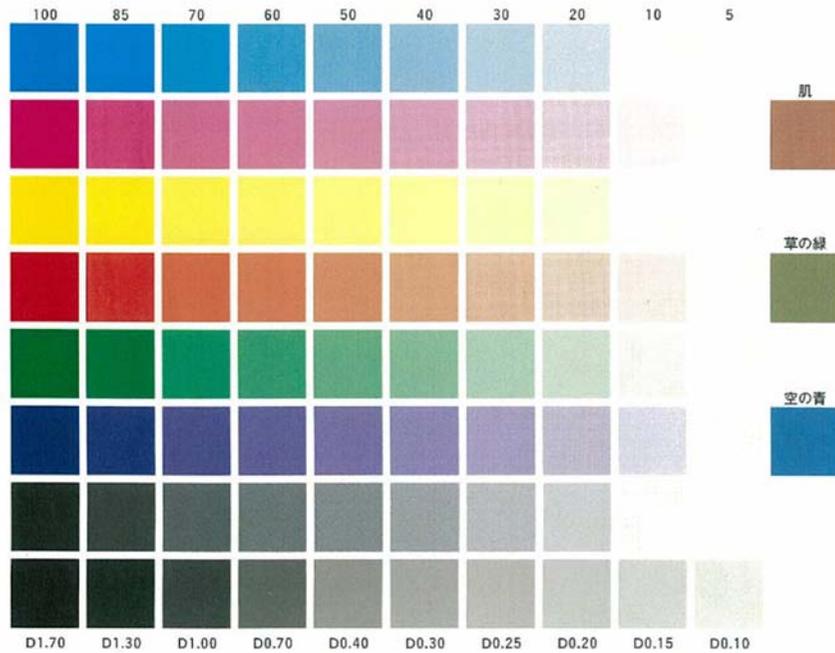We conduct many of these
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Towards Integration and Normalisation of Technology

in the Japanese EFL Context:

An Ecological Perspective on Foreign Language Teaching

A Dissertation Submitted to

The Graduate School of Foreign Language Education and Research,

Kansai University, Osaka, Japan

In Partial Fulfillment of the Requirements for the Degree

Doctor of Philosophy in Foreign Language Education and Research

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by

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論文要旨（概要）

本論文では，まず，(1) 外国語教育におけるテクノロジー利用を阻害する要因を，教員の視点から質的に調査して明らかにする。その後，明らかにされた阻害要因を取り除き，外国語教育におけるテクノロジー利用の integration (統合) と normalisation (日常化) を実現するため，エコロジカルな視点に基盤を置きながら，(2) 日本の English as a Foreign Language (EFL) 環境において実現可能な授業モデルを提案し，(3) その有効性を質・量の両アプローチから検証する。さらに，(4) その授業モデルの汎用性の範囲を検証するため，異なる条件での実践を行い，有効性を再検証する。最後に，(5) これらの研究結果を基にして，外国語教育におけるエコロジカルな視点の有用性を検討し，今後の CALL 研究の方向性を指し示していきたい。

本博士論文は，上述した目的を実現するために，3 つの実証研究を含む，全 7 章から構成した。第 1 章では，本論文を執筆するにあたった経緯や背景について説明し，各章の概要について述べる。

第 2 章の前半では，1960 年代から本格的にはじまった CALL (computer-assisted language learning) 研究について，歴史的な流れに沿い，先行研究のレビューを行う。先行研究は，3 つの区分，つまり，(ⅰ) 1940 年代から1960 年代，(ⅱ) 1970 年代から 1980 年代，そして，(ⅲ) 1990 年代以降にそれぞれ区分され，各区分の特徴が提示される。第 2 章の後半では，CALL 研究の到達点とされる integration と normalisation の概念を示し，CALL 研究の方法論の変化にも触れながら，本論文のリサーチ・クエスチョン (RQ) を提示する。

Integration と normalisation とは，教授者や学習者に不必要な負荷をかけず，また，授業進行を妨げることなく，教科書や鉛筆などを自然と手に取るように，テクノロジーを不可欠な要素として授業実践に導入しようとする考えである (Bax, 2003; Chamber & Bax, 2006; Warschauer, 1998)。しかしながら，外国語教育におけるテクノロジー利用の integration や normalisation は，多くの教室で未だほとんど実現されてはいない (Chamber & Bax, 2006)。授業支援のために導入されたテクノロジーが，実際には十二分に活用されてはおらず (e.g., Cuban, Kirkpartrick, & Peck, 2001)，逆に教員に過度な不安と負担を与え，授業を阻害する要因になっている事例も報告されている (e.g., Kessler, 2007)。

こうした現状を解決する第一歩として，外国語教育におけるテクノロジー利用を阻害する要因について調査した研究はいくつか存在する (e.g., 枝澤・竹内・佐伯, 1994; Kessler, 2007)。しかし，それらに対しては，教員のテクノロジー利用を，実際の授業コンテキストから切り離して調べたものであるという問題点が指摘されている (Zapata, 2004)。Zapata (2004) は，教員のテクノロジー利用や授業進行がどのように阻害されているのかを調査するためには，実際の授業を観察することが不可欠であると指摘している。Egbert, Huff, Mcneil, Preuss, and Sellen (2009) は，従来の CALL 研究では，個々の授業コンテキストが十分に加味されることがなく，また，教員の視点から外国語教育におけるテクノロジー利用についての問題が，検討されることが少なかったと指摘している。同様に，Lafford (2009) も，教員の視点の重要性を指摘し，外国語教育におけるテクノロジー利用の integration と normalisation の阻害要因を，授業観察等を通して，授業コンテキストに即して明らかにする必要があると指摘している。

上記のような integration と normalisation とに関する議論は，CALL 研究の方法論にも影響を与えている。Lafford (2009) や Garrett (2009) は，実験群と統制群を設け，外国語教育におけるテクノロジー利用の効果を測定するような比較研究は，今日的なテクノロジーと外国語を学ぶ環境の広がりを考慮するならば，すでに過去のものになったことを指摘し，具体的な授業コンテキ

ストにおいてテクノロジーを実践に統合しながら活用し，その変化のプロセスを多様な角度から記述する CALL 研究が必要であることを強調している。

しかし，外国語教育におけるテクノロジー利用の integration と normalisation を主眼とした授業実践を，多様な角度から長期に渡って検証した研究は，著者の知る限りでは未だ報告されていない。また，テクノロジーの実践への統合を可能にする授業モデルも十分に検討されてはいない (Parks, Huot, Mamers, & Lemonnier, 2003)。以上のことを踏まえ，第 2 章の後半では，以下に述べる 3 つの RQ を提示する。

1. 日本の EFL 授業コンテキストのなかで，どのような要因が教員のテクノロジー利用を阻害しているのか？

2. 日本の EFL 環境において，阻害要因を取り除き，テクノロジー利用の integration と normalisation を実現するためには，どのような理論に基づいた授業モデルが適切なのか？

3. 提案された授業モデルに基づく実践は，本当に期待した効果を生み出すのか？

第 3 章では，外国語教育におけるテクノロジー利用を阻害する要因を，授業コンテキストの中で，教員の視点から質的に調査する。本章の後半では，この調査結果を受けて，エコロジカル・パースペクティブの必要性についても論じる。調査は，LL または CALL 教室の利用経験のある英語教員 24 名を対象に行った。研究手法は，テクノロジーが実際に利用されている教授場面を観察することの重要性を説く Zapata (2004) の指摘を参考に，インタビュー調査と授業観察とを併用した。インタビュー調査によって得られたデータは，グランデット・セオリー・アプローチ (Corbin & Strauss, 2008) を参照しながら分析した。分析の結果，3 つの阻害要因，つまり，(A) 技術的

要因，(B) 環境的要因，そして，(C) 機関的要因が明らかになった。この結果を受けて，上述の 3 つの阻害要因が，実際の授業の中で，どのように教員のテクノロジー利用を阻害しているのかを明らかにするため，授業観察を行った。その結果，(A) に関しては，操作ボタンの配置やラベリングの不一致，必然性のない機器配置などの normalisation の欠如が，教員の機器操作を阻害していることが分かった。(B) に関しては，教室の形態が，教員と学生とのスムーズなインタラクションを妨げていることが分かった。(C) に関しては，ほとんどの教育機関で実質的なサポートやトレーニングがなく，このため教員が抱える問題をさらに深刻なものにしていることが分かった。第 3 章の後半では，こうした問題が起きる背景に，インストルメント・パースペクティブ (Warschauer, 1998)，つまり教員が何を，どのように教えるのかといった授業コンテキストを無視した機器導入があることを指摘し，問題を解決するために，授業コンテキストと機器導入・利用を不可分に捉えるエコロジカル・パースペクティブ (Tudor, 2003; Warschauer, 1998) が必要であることを主張する。加えて，エコロジカル・パースペクティブを実践へと具体化するためには，教室環境におけるコンピュータ利用に限定された狭義の CALL の考えには限界があり，ネットワークを利用して教室外にその射程を広げる広義の CALL，つまり TELL (technology-enhanced language learning) へと，考え方を転換していく必要があることを述べる。

続く第 4 章では，まず，前章で提案したエコロジカルな視点を踏まえて，外国語教育の授業実践にテクノロジー利用を統合していくための授業モデルを検討した。検討の結果，「授業の円環」(竹内, 2007b) が最も日本の EFL 環境にふさわしいものの 1 つとして浮かび上がってきた。このモデルは，竹内 (2007b) が日本の EFL 環境を念頭に置き，エコロジカルな視点から，授業実践にテクノロジーを統合することを意図して考案したものである。

本章後半では，「授業の円環」モデルを実践に移す際の環境設定について議論した。まず，第 3 章の結果を踏まえ，複雑な機器操作や恣意的な機器配置の問題を取り除くために，教室内での機器操作を一掃することが提案された。具体的には，教室内でテクノロジーを使う代わりに，授業外でウェッブ・ベースのテクノロジーの 1 つである LMS (Learning Management System) を使うという広義の CALL の考え方を採用することになる。これは，教室内での機器利用から教員と学習者を解放することで，学習者の授業参加や発言を引き出すためのインタラクションに，授業時間の多くを費やすことを意図してのことである。また，スムーズなインタラクションを妨げる LL や CALL 教室ではなく，フレキシブルに座席の位置を変更できる可動式の机のある普通教室を使うことが提案された。こうすることによって，教員が一方的に教える授業運営ではなく，教員と学生による双方向の言語活動を中心とした授業運営が可能になるものと予想された。加えて，教員が必要とする支援を提供するために，サポータ的な人材も配置することも提案された。

第 5 章では，実際に「授業の円環」を踏まえた授業実践を実施し，その結果を質と量の両アプローチから検証した。本検証は，大学生 (19 名) を対象に，1 年間の実践によって得られたデータを基に，2 つのサブ RQ—(1)「授業の円環」に基づく授業実践は，学生の英語力の向上にどのような影響を与えるのか？　(2)「授業の円環」に基づく授業実践は，教員の授業設計にどのような影響を与えるのか？—を明らかにすることを目的に行った。分析の結果，この授業実践が，学生の英語力の向上に寄与していた可能性が高いことが確認された。加えて，「授業の円環」に基づく授業実践は，教員の授業設計を質的に改善したことが確認された。

第 6 章では，日本の EFL 環境下でのこのモデルの汎用性を検証するために，公立中学校の 2 年生 (93 名) を対象に 1 年間の実践を行った。その結果，エコロジカルな視点に基づく「授業の円環」を踏まえた授業実践が，中学校

においても，学習者の英語力の向上に寄与し，授業者の授業デザインの改善を助けている可能性 (つまり汎用性) が確認された。

最終章では，本研究の限界点と将来への示唆を述べる。その後，第 2 章で示した RQ に答える形式で，本論文で報告された研究結果の要約を行う。また，教育的示唆についても述べ，最後に，CALL 研究の将来へ，示唆を与える。

本研究の限界点としては，まず，エコロジカル・パースペクティブが，教員中心の視点から論じられていたことがあげられる。外国語教育においては，当然，学習者，学校経営者，および教材開発者などの視点も含む必要があるため，今後，このような多様な視点についても含んで研究を展開して行く必要があろう。次に，本研究においては，LMS 以外のテクノロジー (例えば，各種のハンドヘルド・コンピュータ) を使っての授業モデルの検証ができなかったことがあげられる。今後は，他のテクノロジーも統合した授業モデルの検証を行う必要性がある。

以上に述べた限界点を踏まえた上で，第 2 章で示した RQ に対して，本研究を通して，次のような答えを提供した。

1. *日本の EFL 授業コンテキストのなかで，どのような要因が教員のテクノロジー利用を阻害しているのか？*

3 つの阻害要因 (「技術的要因」，「環境的要因」，「機関的要因」) があり，そのそれぞれに関して，操作ボタンの配置やラベリングの不一致，教室の大きさ，サポートの不在などの具体的な阻害形態が指摘できた。

2. 日本の *EFL* 環境において，阻害要因を取り除き，テクノロジー利用の *integration* と *normalisation* を実現するためには，どのような理論に基づいた授業モデルが適切なのか？

エコロジカル・パースペクティブに基づく「授業の円環」のモデルが最も適当だと考えられる。

3. *提案された授業モデルに基づく実践は，本当に期待した効果を生み出すのか？*

質・両の両面から検証し，その有効性を確認した。さらに，この授業モデルの汎用性を検証するために，日本の *EFL* 環境の中の異なる条件下でも実践を行い，若干の調整さえ行えば，このモデルに基づく実践が他の条件下でも有効に作用することを確認した。

今後の CALL 研究については，Garrett (2009) も指摘するように，授業実践にテクノロジーを統合するようなアプローチが必要とされている。この流れの中で，外国語教育におけるテクノロジー利用の integration と normalisation の考え方は，今後も引き続き CALL 研究の主要な課題であろう。そして，本研究でモデル構築と実践の基盤として利用したエコロジカル・パースペクティブは，外国語教育におけるテクノロジー利用の integration と normalisation を実現するために，ますます重要な視点となって行くであろう。

Acknowledgements

The idea for this dissertation emerged from numerous communications and interactions with teachers and friends whose contributions greatly benefited my research projects. Without them, this dissertation would not have been possible, and I therefore thank them for the privilege of having known them over many years.

Soon after I started my Ph.D. research at Kansai University in 2004, I had the good fortune to attend a series of lectures, entitled *Language Teaching and Technology*, given by Professor Osamu Takeuchi, my Ph.D. supervisor. The lectures were instrumental in helping me shape this dissertation. What I remember the most clearly about the lectures is Professor Takeuchi's statement, "All media for language education should be transparent." It formed the basis of my research project, the purpose of which was to translate the statement into some forms of pedagogy by means of technology. I am deeply indebted to his expert comments and detailed feedback. His comments and suggestions were invaluable throughout the course of my study. I have learned (and will learn) many things from him not only about academic research but also about the importance of foreign language education.

Further, I am grateful to Professor Yutaka Kitamura of Kansai University. He opened a door for me and gave me the chance to restart my professional career, although my knowledge in this field was limited. My special thanks are due to Professor Eiji Saito of Kyoto University of Foreign Studies for his kind encouragement. He gave me many opportunities that I would never have experienced without his help. Special thanks also go to Mr. Motonobu Furukawa for providing me a supportive environment to conduct research. Without his generous support, this dissertation would not have been possible.

I would like to express my appreciation to many students and teachers who participated in the studies. They gave me an insight into real situations that they were facing, which made the research project more meaningful. I am also grateful to many friends at the Graduate School of Foreign Language Education and Research, Kansai University. They are unfortunately too numerous to mention by name, but their advice and support were helpful in many aspects.

I wish to extend my special thanks to my parents, Tadaaki and Kazuko, who agreed to my decision to embark on this research project without expressing any misgivings and who always encouraged me to complete this project. I am personally indebted to them for their generosity and moral support throughout.

Last but not least, I would like to thank my wife and the best academic partner, Tomomi, for her understanding and support. She always encouraged me when I faced difficulties, and she lent additional meaning to this dissertation.

Table of Contents

1. Introduction

The development and expansion of technology into foreign language teaching have been evident in the studies of language laboratories (hereafter LL) and computer-assisted language learning (hereafter CALL). Influenced by changes in advanced technology, some researchers have asserted "teachers must therefore meet the challenge of this continually evolving technology and embrace CALL as a powerful instructional partner" (Fotos & Browne, 2004, p. 12). However, has technology actually improved language learning? Have we received the benefit of the use of technology in foreign language teaching? Provided that the answer is positive, why do we often experience difficulties when we use technology in foreign language teaching? Why do we have to deal with troublesome and complicated systems in CALL classrooms? Why do we have to spend valuable time on troubleshooting software and hardware glitches, even though we are foreign language teachers? Above all, why do we have to adjust our way of teaching to accommodate the technological features of LL and CALL classrooms?

Considering the history of the use of technology in education, we can find many examples to illustrate the problematic situations described above: Moore, Morales, and Carel (1998) reported that teachers in general barely used technology such as the Web, e-mail, and CD-ROMs in the classroom. Yang (1998) highlighted the difficulties of setting up networked multimedia environments for language education. Cuban, Kirkpartrick, and Peck (2001) said that the installation of technology in educational settings has seldom led to its widespread use by teachers and students. Adams (2003) said that Microsoft® spent an estimated $2.5 million on developing interactive reference CD-ROMs for children, but the project failed because of the developers' lack of understanding of the target audience. In the Japanese context,

Shimizu, Yamamoto, Horita, Koizumi, and Yoshii (2007) insisted that although technology was pervasive at the individual level, it has hardly been used effectively in the classroom. The author of this dissertation had participated in many projects to develop language teaching materials. These included English, Chinese, and Japanese software and systems development, which involved a great deal of his time and efforts. However, there was no continuity in the use of these materials once the initial projects were completed. The end of funding implied the end of the projects. The change of staff indicated the change of the projects.

What do these cases tell us? What should we learn from these cases? While some problems will be solved by technological advancements, most of the problems seem to arise from the technology-driven perspective of CALL in which people firmly believe that technology itself improves language learning.

There was a very well-known debate on the use of media in education with regard to its effect. Clark (1983) said, "media do not influence learning under any conditions" (p. 445); he subsequently claimed, "media will never influence learning" (Clark, 1994, p. 21). In response to Clark (1983, 1994), Kozma (1994) emphasized the importance of understanding interactions between technology and learners. According to him, Clark (1983, 1994) treated media as mere vehicles for transmitting information to learners and ignored the relationship between the media and cognitive and social processes in the learning environment. A few years later, Joy II and Garcia (2000) responded to the debate and outlined a question for the use of media in education as follows: "What combination of instructional strategies and delivery media will best produce the desired learning outcome for the intended audience?" (p. 33)

Since the late 1990s, the perspective of CALL research has broadened beyond the simple measurement of its effectiveness (Egbert, 2005; Warschauer, 1998). Kern

(2006) clearly stated that "there is consensus in CALL research that it is not technology per se that affects the learning of language and culture but the particular uses of technology" (p. 200). In addition, he stressed the importance of both teaching methods and the teacher for successful CALL practices. However, we still witness studies that proclaim the positive effect of the use of technology in language teaching, simply comparing the progress in the linguistic abilities of students in CALL classrooms with those in non-CALL classrooms. Furthermore, there has been an ever-increasing pressure from society and the market to use technology in educational institutions. As a result, schools attempt to purchase advanced technology without questioning its worth and exhibit it as if it would effortlessly bring successful results in education.

Whenever the author noticed advanced technology installed in CALL classrooms, he wonders who is going to use it, how, and why we need to use it. There must be other ways of using technology that provide teachers with greater flexibility and spontaneity, and there must be appropriate ways of using technology in the Japanese EFL context.

In the midst of research, I came across a book by Suri and IDEO (2005) and encountered the concepts of "normalisation" (Bax, 2003) and "integration" (Warschauer, 1998, 2004). The book includes many pictures. The pictures captured scenes from everyday life as well as street objects. Although the pictures simply showed very common scenes from everyday life, they revealed how people use tools and interact with the surrounding environment in a particular context. The book also presented the concept of "thoughtless acts" (Suri & IDEO, 2005, p. 164), which means that we act and use tools without too much thought in a given context of everyday life. According to Norman (1988), we use more than 20,000 everyday things, but we barely remember them because they have been embedded in the context in which they have been used. We use keys, cups, pens, and chairs without thinking about them too much. In 1998, Fukazawa, a product designer and founder of IDEO Tokyo office, had a workshop titled "without thought" (Fukazawa & Diamond Design Management Network, 2007). He devised a concept, "design dissolving in behavior," and re-designed everyday things in the workshop. During the workshop, he said that people acted and behaved in response to a given context of a surrounding environment, and tried to find the meaning and function of tools from time to time in the context, which had been embedded in their everyday life (Fukazawa, 2005).

Similarly, Bax (2003) devised the concept of *normalisation*. Normalisation means the stage when technology becomes invisible, embedded in everyday practice. According to him, everyday things such as a wristwatch, pen, book, and shoes have become normalised, so that we use them without too much consideration. He asserted that technology in foreign language teaching should be normalised and that normalisation can be an end goal of CALL research. Warschauer (1998) used the term "integration" and said "the truly powerful technologies are so integrated as to be invisible" (para 11). In the focus issue of *The Modern Language Journal* featuring the latest CALL studies, Lafford (2009) also emphasized the importance of finding a way to integrate technology into teaching practices in a given local context beyond "the prevailing drill-and-kill exercises for learning vocabulary and grammar" (p. 676).

In this way, the concepts of integration and normalisation have become particular interests of the author, and have consequently led him to believe that it is important to re-design technology use in foreign language teaching. Bax (2003) mentioned that future CALL practices should be as follows.

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They [computers] will not be the center of any lesson, but they will play a part in almost all. They will be completely integrated into all other aspects of classroom life, alongside coursebooks, teachers and notepads. They will go almost unnoticed. (p. 24)

The author believes that Bax's outline of practices described above clearly indicates the direction of future CALL research and the concepts of integration and normalisation of technology use in foreign language teaching.

I started my dissertation project base on this line of research. The purposes are as follows: (a) to qualitatively investigate factors that impede teachers' use of technology in foreign language teaching, (b) to propose a teaching model, which is based on an ecological perspective and viable in the Japanese EFL context, for ameliorating the impeditive factors and achieving integration and normalisation of the use of technology in foreign language teaching, and (c) to investigate the efficacy of the model quantitatively and qualitatively. To these ends, this dissertation includes seven chapters. Chapter 1, the current chapter, presents the research background and outline of the dissertation.

In the first half of Chapter 2, a review of the use of technology in foreign language teaching from a historical perspective is provided. The history of the use of technology is divided into three phases and the features in each phase are explained. In the second half of Chapter 2, new concepts for future CALL research, *integration* and *normalisation* (Bax, 2003; Chamber & Bax, 2006; Warschauer, 1998), are presented. These concepts aim at integrating technology into teaching practices. They are perceived as an end goal of CALL research (Bax, 2003). However, we can easily observe situations where teachers experience difficulties in using technology and find the systems and instruments in LL or CALL classrooms to be cumbersome

and troublesome. These situations indicate that integration and normalisation are yet to be achieved in most educational settings (Chamber & Bax, 2006).

Many studies have been conducted to illustrate these dire situations (Edasawa, Takeuchi, & Saeki, 1994; Kessler, 2007). Zapata (2004), however, criticized those previous studies and claimed that it was important to observe the actual use of technology by teachers in a local context wherein technology was being used.

In parallel, since integration and normalisation became important issues, a new trend in CALL research and practices has been observed, in which traditional comparative studies have become obsolete. Lafford (2009) said, "[as] technology becomes more ubiquitous and invisible, it is extremely difficult to find a true control group that uses no technology to learn an L2" (p. 684). As a result, CALL research has been moving toward more "integrative" (i.e., holistic) studies of the use of technology and teaching practices in given local contexts.

In addition, since the discussion about integration and normalisation has just begun, longitudinal studies that aim at examining the process of attaining integration and normalisation of the use of technology in foreign language teaching have yet to be conducted to the best of the author's knowledge. Further, actual pedagogical models aiming at integration and normalisation have yet to be fully investigated in a real educational setting (Neumeier, 2005; Parks, Huot, Mamers, & Lemonnier, 2003; van Deusen-Scholl, Frei, & Dixon, 2005). On the basis of the aforementioned trend in the literature review, the following three research questions are formulated:

1. *What are the factors that impede the use of technology by teachers in the Japanese EFL context?*

2. *Which teaching model (based on a theoretical perspective) is feasible for attaining integration and normalisation of technology use in foreign language teaching in the Japanese EFL context?*

3. *Does the teaching practice based on the model really have the expected effects?*

Chapter 3 (Study 1) explores the use of technology in foreign language teaching by teachers and investigates the factors that impede integration and normalisation of the use of technology in teaching contexts. Qualitative methodologies such as interviews and classroom observations were used to explore the context in which foreign language teaching actually occurred with the aid of technology. As a result, three factors namely, (a) Technology factor, (b) Environment factor, and (c) Institution factor that seemed to be impeding the use of technology were found. This result indicated that the use of technology should be investigated totally in the context. An ecological perspective, which explores the use of technology within the totality of the context in which actual language teaching occurs, was thus adopted in this dissertation to achieve integration and normalisation. In addition, to ameliorate the impeditive factors and bring the perspective into effect as a teaching practice, both the limitations of CALL in a narrow sense, which confine the use of computers to *inside the classroom*, and the importance of shifting CALL to TELL (technology-enhanced language learning, Dreyer & Nel, 2003; Warschauer, 2005), which extends the use of technology to *outside the classroom* by means of the Internet, were emphasized.

In Chapter 4, to integrate technology into a teaching practice, the "cyclic model of learning" (hereafter CML, Takeuchi, 2007b) based on the ecological perspective is introduced. The most distinctive feature of the CML is to integrate in-class teaching with outside-the-class students' self-learning, which is indispensable for successful foreign language learning, with the aid of technology, paying special attention to the Japanese EFL context.

In Chapter 5 (Study 2), a teaching model based on the CML is tested on college undergraduate students. The influence of the teaching practice on (a) the improvement of students' English ability and (b) the manner in which the instructor conducts lessons was investigated. The results confirmed that there was a positive influence of the practice.

In Chapter 6 (Study 3), the CML-based teaching practice is tested again, but, this time, on public lower secondary school students to confirm the applicability of the practice to a larger context. The results indicated that the practice based on the CML had a positive influence on students' learning and the manner in which the teacher conducted lessons. The applicability of the model to a larger context was thus confirmed.

In the last chapter, some limitations of the studies are addressed, and the research findings in this dissertation are summarized. Moreover, pedagogical implications and suggestions for future research are presented.

2. Literature Review

The purposes of this chapter are (a) to review the use of technology in foreign language education from a historical perspective and (b) to discuss the current status of research in CALL, utilizing two key terms: *integration* and *normalisation* (Bax, 2000, 2003; Chambers & Bax, 2006; Warschauer, 1998, 2004). The history of the use of technology in foreign language teaching can be divided into three phases with regard to teaching approaches and technology available at that time (Bax, 2003; Fotos & Browne, 2004; Kern, 2006; Levy, 1997; Takeuchi, 2002a; Warschauer, 1998, 2004). In this chapter, the specific features of each phase are reviewed, and the research questions proposed in Chapter 1 are discussed with regard to them.

2.1   1940s–1960s

Fotos and Browne (2004) mentioned that the first phase of CALL was devised and developed in the 1960s and 1970s. In the broadest sense, however, we can see the use of technology in foreign language teaching well before the 1960s. The rudimentary form of LL appeared on the scene around 1880 (Takeuchi, 2002a), and the first practical LL system was launched at Middlebury College in Vermont, USA with 10 booths in 1929 (Hocking, 1967; Takeuchi, 2002a). In the 1940s, the LL system was used mainly for intensive language training courses in the army and achieved significant results (Chastain, 1988).[1] Thereafter, in the 1950s, the locus of the use of the LL system shifted from the army to higher educational institutions (Hilton, 1964; Hocking, 1967).[2] Structural linguistics and behaviorism provided a theoretical foundation to the practice of using LL systems, and this foundation was combined to create the Audio-Lingual Method (Chastain, 1988; Kohno, 1972; Takeuchi, 2002a).[3] In the Audio-Lingual Method, teachers gave students simple drill-and-practice programs in the target language, and the students were expected to precisely emulate the models given in the programs until they could orally repeat them effortlessly.[4] Computer software developers soon realized that drill-and-practice activities could be executed on computers because of their simple and linear character (Levy, 1997). However, we had to wait until the 1960s to see a pioneer project of CALL (Fotos & Browne, 2004).

Levy (1997) noted that CALL had its genesis in the Programmed Logic for Automatic Teaching Operations (PLATO) project, which was initiated at the University of Illinois in 1960 and considered to be the first computer-assisted instruction system. In the 1960s, programmable microcomputers that enabled teachers to create a simple linear-type practice were also developed and introduced into the market. In this period, although interest in the use of technology shifted from LL to CALL, structural linguistics and behaviorism were still predominant.

Warschauer and Healey (1998) devised the term, "Structural CALL," to identify this period. Similarly, Bax (2003) presented the term, "Restricted CALL," which means that everything used for foreign language teaching at the time, such as theories, hardware, software, and activities, was relatively restricted. According to Bax (2003), "Restricted CALL" dominated language teaching from the 1960s until about the 1980s. He also emphasized that "Restricted CALL" is not a thing of the past, but exists and is used in many places.[5]

By the end of the 1960s, however, the structural linguistics and behaviorist approaches were being challenged by a more cognitive approach—the Cognitive Code Learning Approach (Bax, 2003; Fotos & Browne, 2004; Levy, 1997; Takeuchi, 2002a; Warschauer & Healey, 1998; Warschauer, 2004).

2.2 1970s–1980s

The Cognitive Code Learning Approach was based on transformational generative grammar, which is a linguistic theory associated with Chomsky (1957), and on cognitive psychology. In this approach, language became an object that was discovered rather than taught. In parallel, yet another teaching method, the Communicative Language Teaching Method, was introduced in Europe, and the emphasis in language learning shifted from accuracy to fluency (Chastain, 1988; Kohno, 1972; Mitchell & Vidal, 2001; Takeuchi, 2002a).[6]

In addition, more advanced forms of microcomputers became available in this period, which allowed motivated language teachers to write simple CALL programs (Levy, 1997) and learners to study with the interactive software (Fotos & Browne, 2004). The potential of CALL was recognized and this led to the appearance of specialized journals, such as the *CALICO Journal*, which first appeared in 1983, and the *ReCALL,* which first appeared in 1989. In the UK, the government-funded National Centre for Computer Assisted Language Learning was established in 1985. Computer-Assisted Instruction and Computer-Mediated Communication became common terminologies. In this period, CALL came closer to fulfilling Levy's definition: "The search for and study of applications of the computer in language teaching and learning" (Levy, 1997, p. 1).

Warschauer and Healey (1998) categorized the practices in this period as "Communicative CALL," which corresponded to the spread of communicative teaching approaches. Meanwhile, Bax (2003) devised the term, "Open CALL," which means CALL became relatively open in many aspects in comparison with "Restricted CALL" in the previous phase.

The features in the 1970s–1980s can be summarized as follows: the decreased influence of the Audio-Lingual Method led to the creation of several other teaching

approaches. In addition, there was increased availability of computers and evolution of practices with computers. Along with the development of technology and practices, professionals and educators became more interested in observing the interrelated process between teachers and learners in CALL. Levy (1997) said "the 1980s were a highly creative decade" (p. 3).

The latest turning point of CALL research happened in the late 1980s. During this period, sociocultural perspectives that place greater emphasis on language use in social contexts started gaining attention. As a result, many researchers and educators were moving away from communicative cognitive perspectives to more social or socio-cognitive ones (Warschauer & Healey, 1998).

2.3 1990s and Later

Sociocultural perspectives are based in large part on the work of Vygotsky (1986). According to sociocultural perspectives, an individual, at any given moment, is the product of his/her ontogenetic history. Learning is not a one-way process from a teacher to students, but a successive outcome of being a competent member of the community to which students belong. The situation, context, and interrelationship among the constituent members are important and can be resources that influence an individual's self-development (Donato & Mccormick, 1994; Frawley & Lantolf, 1984, 1985; Lantolf, 2000, 2006; Lantolf & Pavlenko, 1995; Mitchell & Vidal, 2001).

Since the advent of sociocultural viewpoints, research spectrum has broadened and technology has been considered to be a part of the environment of foreign language teaching, rather than an optional or supplemental instrument. As a result, how technology should be integrated into all other aspects of foreign language teaching has become one of the most important issues of CALL research (Bax, 2003; Kern & Warschauer, 2000; Warschauer, 1998, 2004, 2005).

In line with the aforementioned changes, Warschauer and Healey (1998) devised the term, "Integrative CALL," which attempts to integrate various language skills and technology fully into language learning process. Bax (2003) also devised the term, "Integrated CALL," and the concept of normalisation, that is to be elaborated on in the next section.

2.4 New Concepts and Trends in CALL Research

2.4.1 New Concepts in CALL Research

The concept of normalisation is the stage at which the use of technology is truly integrated into practice and the physical existence of technology goes unnoticed (Bax, 2003).[7] For example, a wristwatch, a pen, and shoes are all technologies, yet we hardly even recognize them as technologies because they have become normalised in our everyday practice.[8] Bax (2003) called normalisation the final stage of CALL and this concept has provided a new theoretical perspective, an ecological perspective, on the use of technology in foreign language teaching.

Warschauer (1998) also mentioned that:

The truly powerful technologies are so integrated as to be invisible. We have no 'BALL' (book-assisted language learning), no 'PALL' (pen-assisted language learning), and no 'LALL' (library-assisted language learning). When we have no 'CALL,' computers will have taken their place as a natural and powerful part of the language learning process. (para 11)

However, the stage of integration and normalisation has yet to be achieved in most educational settings (Chambers & Bax, 2006). Several studies have been carried out to identify factors that contribute to hindering the use of technology. For example, Kessler (2007) conducted a Web-based survey of 108 graduates of MA TESOL programs, and concluded that poor quality and limited quantity of CALL-related teacher preparation programs had a significant effect on teachers' (non-)use of technology. Edasawa, Takeuchi, and Saeki (1994) conducted a large-scale survey of 454 schools in which LL facilities had been used, and pointed out the factors that prevented teachers from using technology in foreign language teaching, such as difficulties in using the facilities and lack of supports.

Zapata (2004), however, criticized the previous studies and claimed that it was important to investigate teachers' actual use of technology embedded in the "context" where technology was used. She said "most of the existing studies have been based on instructors' self-reported perceptions and application of instructional technology, but have not investigated actual classroom use or the institutional and pedagogical factors that influence that use" (p. 340). According to Zapata (2004), teachers' perceptions of and readiness for the use of technology in the classroom are not considerations detached from the real "world" in which they live, but are collectively constructed results deeply rooted in local practices.

In this connection, Egbert, Huff, Mcneil, Preuss, and Sellen (2009) insisted, referring Jung (2005) and Kern (2006), that teachers played a vital role in integrating technology into instruction and in determining the success of the CALL classrooms. They also emphasized the importance of investigating CALL practices from teachers' perspectives in a given context, including teachers' voices, observations, and concerns, and said that "most important, studies neglected to look at the context, specifically those areas on which teacher voice and experience could shed light for explanation of the phenomena under investigation" (p. 765). In summarizing previous CALL studies, Lafford (2009) stressed that it was significant

for CALL studies to identify the factors that hinder the integration and normalisation of technology from teachers' perspectives in given local contexts.

2.4.2 New Trends in CALL Research

Influenced by the aforementioned concepts, a new trend in CALL research and practice has been observed. Egbert (2005) reexamined the definition of CALL and stated "CALL means learners learning language in any context with, through, and around computer technologies" (p. 4). Similarly, Kern (2006) claimed to broaden the potential types of relationships between computer technologies and language learning and said "whereas early CALL research generally sought out relatively simple cause-effect relationships between human-computer interaction and learning, current research seeks to understand complex relationships among learners, teachers, content, and technology within particular social and cultural contexts" (p. 201). In addition, he summarized the current issues in CALL research: "In sum, the complexity of the issues involved in technology and language learning is pushing us to look beyond gross decontextualized measures of effectiveness to understand effectiveness in terms of the specifics of what people do with computers, how they do it, what it means to them" (p. 189). Garrett (2009) also insisted that CALL should go beyond simple comparative research between CALL and non-CALL environments. As a result, CALL research has been moving toward more integrative (i.e., holistic) studies of the use of technology and teaching practices in given local contexts: it has come to involve investigating the interconnectedness of technology, theory, and pedagogy in an integrative manner (Garrett, 2009). New research methods such as action research and ethnography based on *emic* perspectives rather than *etic* perspectives have begun to be seen in professional journals.[9] Bax (2003) argued, "we need more in-depth ethnographic studies of individual

environments....We also need action research in individual environments to identify barriers to normalisation and ways of overcoming them" (p. 27). We can thus argue that a new research paradigm and methodology should be introduced to further the development of CALL research.

2.5 Summary

This chapter reviewed the history of the use of technology in foreign language teaching from a historical perspective. To this end, the history was divided into three phases and the features in each phase were elaborated on. In the first phase, from the 1940s to the 1960s, the Audio-Lingual Method prevailed in foreign language education. Drill-and-practice activities were given by means of LL and early microcomputers. In the second phase from the 1970s to the 1980s, the Cognitive Code Learning Approach and later the Communicative Approach became apparent and advanced microcomputers became available. In this period, CALL research expanded its fields and many CALL projects started. In the third phase, from the 1990s and later, sociocultural perspectives were introduced and a comprehensive framework for understanding students' learning was called for. Integration of technology into practices became one of the most important issues of CALL research in this phase. Also eminent in this phase is the shift in CALL research paradigms and methodologies. Figure 2.1 summarizes CALL research in chronological order.
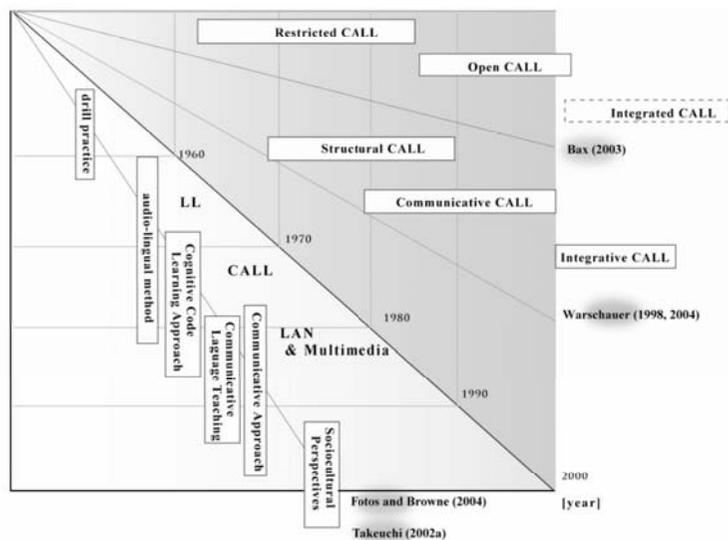
Figure 2.1. Classification of CALL research with key concepts. The horizontal facet segmented by the blue lines shows teaching approaches in chronological order, referring to Fotos and Browne (2004) and Takeuchi (2002a). The vertical facet segmented by the red and green lines shows the classification of CALL in chronological order, referring to Bax (2003) and Warschauer (1998, 2004).

The author believes that integration and normalisation as currently discussed in CALL research are keys to implementation of a successful CALL practice. Based on the discussion described above, the author formulated the three research questions rendered on page 7 of Chapter 1. These questions will be dealt with in the ensuing chapters of this dissertation.

Notes

1. The teaching method practiced in the army was called the Army Specialized Training Program or the Army Method (Chastain, 1988).

2. *The National Interest and Foreign Languages* was published in 1954 (Parker, 1954). The report mentioned that the study of second languages was needed to improve the oral communicative ability of language learners (Chastain, 1988). In addition, the launch of Sputnik by the Russians increased people's awareness of the importance of international relations. Soon after that, in 1958, *the National Defense Education Act* went into force and a huge amount of money was supplied to higher educational institutions to purchase state-of-the-art LL systems, materials, and equipment (Dakin, 1957; Hilton, 1964; Hocking, 1967; Salaberry, 2001).

3. The method was systematized by Fries (1945) and his concepts were welcomed by linguists and educators.

4. According to van Patten and Williams (2007), the Audio-Lingual Method emerged in the 1950s. Ivan P. Pavlov's famous work on classical conditioning influenced the development of the method, and thereafter Skinner's learning model provided the fundamentals of the Audio-Lingual Method. He claimed that "by making each successive step as small as possible, the frequency of reinforcement can be raised to a maximum, while the possibly aversive consequences of being wrong are reduced to a minimum" (Skinner, 1954, p. 94).

5. Fotos and Browne (2004) agreed with Bax (2003) by saying: "Even today numerous drill programs still exist for vocabulary study and grammar practice because repeated exposure to such material has been shown to promote its acquisition" (p. 5). In this sense, Bax's categorization, which still recognizes the

existence of drill practices, seems to be more convincing than Warschauer's. In this study, however, dividing CALL research according to chronological order is not the main concern. The main concern is to divide CALL research into three phases based on the general understanding of CALL research and point out the features in each phase in order to introduce new perspectives on future uses of CALL at the end of the chapter.

6. In North America, during the same period, the Comprehensive Approach was in widespread use among practitioners against the backdrop of the Input Hypothesis (Krashen, 1985).

7. Similarly, Wenger (1990) mentioned that once a tool is used in a local context, it obtains a *field of meaning*. As a result, it becomes invisible among people who use it and achieves *cultural transparency*. For discussions about the relationship between tools and human actions in a given context, see also Brown, Collins, and Duguid (1989), Downs and Liben (1993), and Thorne (2003).

8. For tools in everyday life, see also Norman (1983, 1986, 1988).

9. According to Holliday (1996), *emic* perspective attempts to account for human actions and cultures *within* the field where participants are engaged, and *etic* perspective observes social phenomenon or human behaviors without the field as an outsider (p. 251).

3. Study 1

3.1 Purposes

The purposes of this chapter are (1) to investigate the factors that impede the "integration" (Warschauer, 1998) and "normalisation" (Bax, 2003) of the use of technologies in foreign language teaching from teachers' point of view, and, based on the findings, (2) to propose a theoretical perspective that integrates technology into teaching practices.

3.2 Participants and Their Contexts

Interviews were carried out with 24 participants in this study. All of them were English instructors (12 males and 12 females) experienced in using LL or CALL facilities (i.e., technologies) in the Japanese EFL context. Except for one who was teaching at a junior high school,[1] all of them were teaching at tertiary institutions. The participants were selected because of their wide teaching experience and experience in using LL or CALL facilities and computers. Their average length of teaching careers was 14.79 years (*Max* = 30, *Min* = 1, *SD* = 8.64 [year]) and experience of using computers was 17.79 years (*Max* = 30, *Min* = 5, *SD* = 7.11 [year]). Among them, a total of 23 instructors used computers every day and quite often. Nineteen of them had experience in using LL facilities, and sixteen of them had experience in using CALL facilities.

To get more detailed information, classroom observations were conducted at five universities. The universities were chosen based on the results of the interviews, and took into consideration the technological settings in classrooms and students' levels of English.[2] Also, in this study, an in-depth explanation of two classes was

provided among the five classroom observations, as examples of typical LL and CALL classroom settings in the Japanese EFL context (Cases 1 and 2).[3]

The classroom setting of Case 1 was based on Sony's *LLC-9000*, which is one of the longest-lived and best-selling LL systems. Figure 3.1 shows a picture of the classroom. The instructor, who was in charge of Case 1, had six years' teaching experience at the university and ten years' experience in using computers. The purposes of the Case 1 course were to improve students' listening ability and to enhance their grammatical competence in English. One lesson lasted for 90 minutes. There were 18 students in Case 1. Students' English ability was relatively low with TOEIC® scores ranging from 200 to 400.

Figure 3.1. A picture taken in the classroom of Case 1. The maximum capacity of the classroom is 50. The system in this room is Sony's *LLC-9000*.

The classroom setting of Case 2 was based on an advanced CALL system, Panasonic's *L Stage EZ*. Figure 3.2 shows a picture of the classroom. The instructor, who was in charge of Case 2, had 25 years' teaching experience and 26 years' experience in using computers. There were 40 students in Case 2. The purpose of the course was again to improve students' listening ability. One lesson lasted for 90

minutes. Students' English ability was intermediate with TOEIC® scores ranging from 400 to 600.
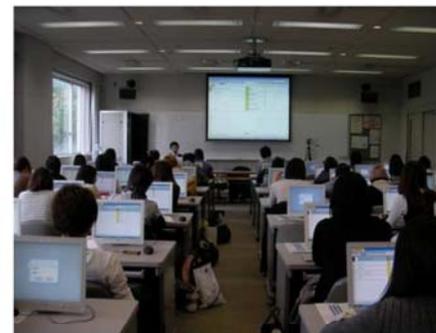
Figure 3.2. A picture taken in the classroom of Case 2. The maximum capacity of the classroom is 60. Individual computers are available to all students.

3.3   Method

3.3.1   Data Collection

A semi-structured interview was adopted for this study because it allows interviewees to elaborate on particular issues and introduce new ones (Thornton & Sharples, 2005). Each interview lasted 30–60 minutes per participant, and interviews were recorded and later transcribed by the author with the participants' permission. Major questions asked during the interview were regarding (a) their present use of technology, (b) the factors that might affect the use of technology in the classroom, and (c) their perception of (or reactions to) using technology in foreign language teaching. Interview data were collected from January 2007 to February 2008, and all interviews were conducted in Japanese and translated into English by the author. Table 3.1 shows the list of participants.

Table 3.1

The List of the the Participants

No.	ID	Gender	Years in teaching English	Years in using computers	Experience in using LL facilities	Experience in using CALL facilities
1	01_F01	F	4	18	yes	yes
2	01_M01	M	30	15	yes	no
3	01_F02	F	14	24	yes	yes
4	01_F03	F	22	9	yes	no
5	01_F04	F	6	26	no	yes
6	01_M02	M	13	10	yes	no
7	01_M03	M	25	26	yes	yes
8	01_M04	M	25	20	yes	yes
9	01_M05	M	30	30	yes	yes
10	01_M06	M	27	30	yes	yes
11	01_F05	F	6	9	yes	yes
12	01_F06	F	15	20	yes	yes
13	02_M01	M	19	23	yes	yes
14	02_M02	M	6	10	yes	no
15	02_M03	M	20	25	yes	no
16	02_F01	F	6	20	yes	no
17	02_F02	F	12	15	yes	no
18	02_F03	F	20	25	yes	yes
19	02_F04	F	1	5	no	yes
20	02_F05	F	4	9	no	yes
21	02_M04	M	16	15	no	yes
22	02_M05	M	16	17	yes	yes
23	02_M06	M	5	11	yes	yes
24	02_F06	F	13	15	yes	yes

Based on the findings obtained through the interviews, classroom observations were conducted at five universities to investigate difficulties in the use of technology within the classroom context, with the permission of the instructors in charge.

In the classroom observations, instructors' actions during lessons were recorded from multiple perspectives by applying a triangulation procedure to the data collection process. Triangulation is one of the research methodologies that make it possible to examine the complex structure of practices from multiple sources (Dörnyei, 2007; Takeuchi, 2003). Two video cameras were set up to record instructors' behaviors during lessons. The first video camera was set up to capture instructors' operation of the LL or CALL system. The second camera was set up in the rear of the classroom to shoot the whole classroom. Field notes were taken in Japanese by the author during lessons and later translated into English by him. Follow-up interview sessions were held after lessons to investigate what and how the instructors were thinking while they were using technology during the lesson.

3.3.2 Data Analysis

A part of the Grounded Theory Approach procedure (Corbin & Strauss, 2008, Chapters eight and nine) was used in the analysis of the data collected through the interviews. According to Corbin and Strauss (2008), the Grounded Theory Approach is "a specific methodology developed by Glaser and Strauss (1967) for the purpose of building theory from data" (p. 1), and the analysis in the approach is "a process of examining and interpreting data in order to elicit meaning, gain understanding, and develop empirical knowledge" (p.1).

In general, the process of the Grounded Theory Approach can be divided into four steps: (a) open coding, (b) axial coding, (c) comparative analysis, and (d) conceptual saturation (Corbin & Strauss, 2008; Harada, 2003). Figure 3.3 presents the overall procedure of the Grounded Theory Approach.
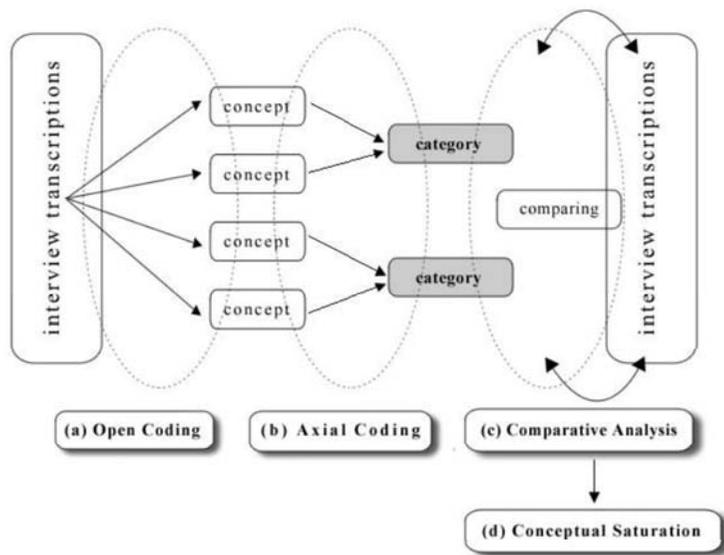
Figure 3.3. The picture illustrates the analytical process of the Grounded Theory Approach (Corbin & Strauss, 2008; Harada, 2003).

According to Corbin and Strauss (2008, p. 159), each step is defined as follows:

(a) **Open coding**:	Breaking data apart and delineating concepts to stand for blocks of raw data
(b) **Axial coding**:	Crosscutting or relating concepts to each other
(c) **Comparative analysis**:	Comparing incident against incident for similarities and differences
(d) **Conceptual saturation**:	Acquiring sufficient data to develop each category/theme fully in terms of its properties and dimensions and to account for variation

In this study, the steps from (a) to (c) were applied. To maintain objectivity in the coding process, inter-rater reliability of all the coding results between the author and a postgraduate student who is majoring in foreign language education was calculated. It was at 82.5%. Intra-rater reliability was also calculated, showing 93.0% of agreement. The author decided that the results were at an acceptable level of agreement, as 70% agreement seems to be the benchmark (Potter, 1996). Disagreements between the raters were discussed and resolved between the two raters. *MaxQDA 2007* (Kuckartz, 2007) was utilized as a tool for analyzing the data. The software has been developed especially for qualitative analysis (Corbin & Strauss, 2008; Lewins & Silver, 2007). Figure 3.4 shows a sample procedure of the analysis.

To analyze the instructors' use of technology in a context in which technology was actually used, video observation data were digitalized and segmented according to the critical aspects of a lesson. Each segment of a lesson was labeled by four features: (a) time, (b) description of action, (c) equipment in use, and (d) scene. These features were generated in accord with C. Goodwin and Goodwin (1998), who observed a workplace in an airport, and divided workers' actions into three categories—time lines, description of situation, and tools that workers used—in order to capture workers' actions as a whole. Based on their idea, the four features were formulated by the author and used to categorize teachers' actions in this study. These four features allow us to capture instructors' successive actions with time-line data and pictorial images and to observe the "entire world" in which teachers are actually involved. These four features also make it possible to investigate how difficulties in the use of technology emerge along with instructors' actions within the classroom context.
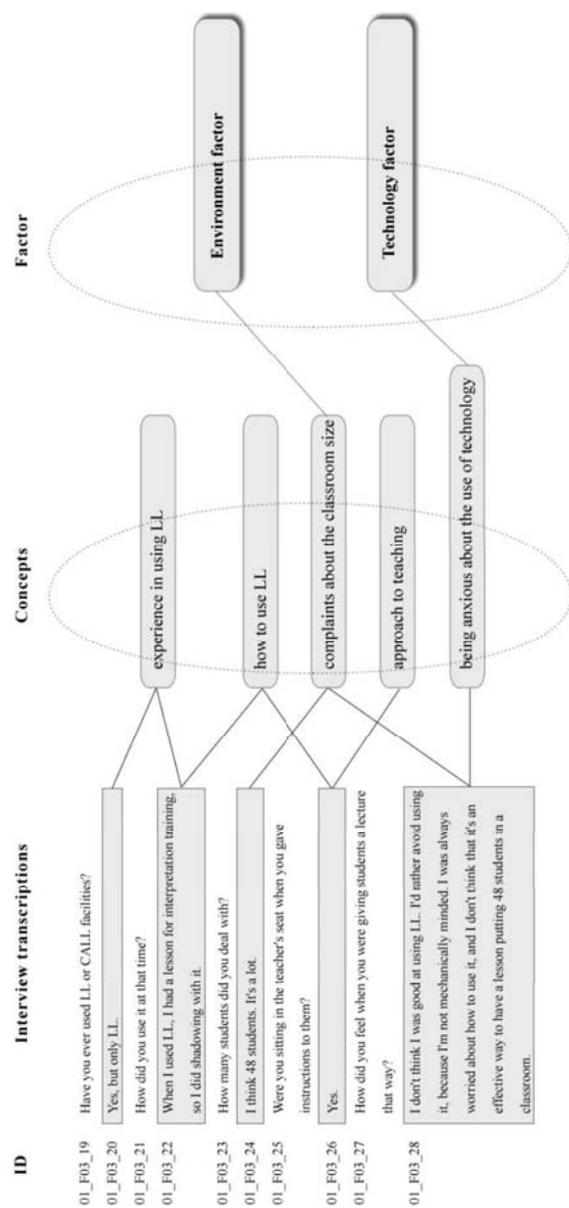
Figure 3.4. The figure shows a sample procedure of the analysis of interview data.

3.4 Results

3.4.1 Interview

As a result, three factors that seemed to be impeding the use of technology in foreign language teaching were found:

1. *Technology factor* (with 4 sub-factors)
2. *Environment factor*
3. *Institution factor* (with 2 sub-factors)

Technology Factor

The factor includes (a) gaps in intention between system developers and instructors, (b) system instability, (c) operation complexity, and (d) constrained technology settings.

A first problem that most instructors complained about was the gaps between what system developers thought that instructors wanted to do and what they in reality wanted to do in lessons.

> It may be OK to have a fully functional CALL system. A company says that you can do this and that. But I am not sure if I can use all of those features in lessons. I just want to use a simple networked classroom instead.
>
> (01_M03_52–53, Translation mine)

> There is a gap between system developers and instructors with regard to the merits of the use of technology in classes. It takes me a lot of time to adjust myself to the system's features. (01_F04_40–41, Translation mine)

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In addition, instructors complained about the instability of CALL systems. This problem tends to be recognized when instructors let students log onto the Internet all at a time or send large amounts of data to them. As a result, CALL operating systems become unbearably instable when processing data traffic, and they sometimes freeze. Once CALL systems freeze, all data for the lesson are gone, so that instructors have to re-start the lesson from scratch.

One thing I must mention is "freezing." I think this is the most serious problem when I use the CALL system. I am always worried about when it will happens.

(01_F06_72, Translation mine)

Especially in summer, when it is hot, the computer system tends to freeze. When it happens, I have to re-start the lesson again from the beginning.

(01_F04_52, Translation mine)

A number of instructors also reported that operation complexity is another problem. Figure 3.5 presents a line of control devices that are placed in a CALL classroom. To use a VTR, a DVD, or a CD player in the CALL classroom, instructors need to manipulate a corresponding control device. The problem of operation complexity especially occurs when an instructor alternately uses several players in succession. System developers tend to install all the devices that are expected to be used during lessons within the limits of the available budget. As a result, each player in the system has a different control device, and this makes operation complex. Norman (1988) criticizes such a phenomenon as "creeping featurism," which means adding features that increase the system's complexity more and more, so that eventually the system becomes unusable and unstable.[4]

Figure 3.5. From the left, control devices for audio, DVD, amplifier, VHS, projector, and an unknown device. They are all placed in a single CALL classroom.

Figure 3.6 presents a typical example of CALL system interface design. The video and sound input resources that are set in different circuits make operating a system difficult for instructors. For example, in order to play a DVD, an instructor needs to select video and sound input resources separately and almost simultaneously. This system setting is clearly different from our "mental model to play the DVD" which gives us predictive and explanatory power for understanding how to play the DVD (Norman, 1983). In addition, there are usually three sets of output-combinations such as student's monitors and headsets, instructor's monitor and headset, and room monitor and loudspeakers. As a consequence, countless numbers of buttons are placed on a console box, and instructors need to control them swiftly during lessons. Instructors commented as follows:

You know, there are many buttons. I have never figured out which is which. It's a mess.

(02_F01_67–67, Translation mine)

DVD, VTR, CD, and Tape; every player has a different control device.

(01_F04_50, Translation mine)

Figure 3.6. Teachers need to select input resources by pushing buttons swiftly during lessons.

The constrained technology settings of CALL classrooms also prevent instructors from using technology. For security reasons, Internet access is limited at one institution. Use of USB memory sticks is not allowed at another institution. Auxiliary connections for outer devices such as notebook computers or handheld devices are not available at some institutions, so that instructors cannot bring their favorite devices into CALL classrooms and use the software of their choice.

In the CALL classroom, Internet access is prohibited. But how can I show my students authentic materials without an Internet connection?

(02_M04_45, Translation mine)

I am not allowed to use my laptop in the CALL classroom. I want to use iTunes, because all my sound and movie materials have been downloaded on it. But I cannot. (02_M03_30, Translation mine)

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Environment Factor

This factor contains no sub-category. Most of the instructors' comments centered on the CALL/LL classroom size. In the Japanese context, CALL classrooms are usually designed to accommodate a large number of students. Classroom size, therefore, is often bigger than typical classroom sizes. In addition, classrooms are crammed to the maximum with desks, chairs, and computers. As a result, they impede smooth interaction between an instructor and students. Figure 3.7 is a picture taken in an LL classroom. There was almost no space left between aisles. What is worse, the students put their bags in the aisle, so that the instructor could hardly walk around the classroom; smooth interaction with students during the lessons was thus hindered.

Figure 3.7. A picture taken in an LL classroom. There is little space available around students, so that they have no choice but to put their bags in the aisle beside them, which prevents the instructor from having smooth interaction with students during lessons.

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Figure 3.8 shows an overall picture of a CALL classroom. The classroom was designed to accommodate about 60 students and each student had an individual computer, so that almost no space was available for interaction between the instructor and the students.

Figure 3.8. A picture taken in a CALL classroom. It is difficult for the instructor to see students' faces and have smooth interaction with them in the CALL classroom.

The instructor who was using the classroom said in the interview as follows:

If you want to conduct student-centered learning, I do not think a CALL classroom is suitable for that. CALL classrooms are better suited for drill practices and individual learning. I think human interaction is important for language teaching, but it is really difficult for me to have it with students in a CALL classroom.

(01_M06_25–26, Translation mine)

In another interview, an instructor commented as follows:

I can barely see the students' faces because of the classroom size.

(02_F01_44, Translation mine)

Institution Factor

Lastly, the institution factor, which includes the lack of (a) teacher support and (b) teacher training, should be explained. This factor was also identified in Chambers and Bax (2006). Most instructors interviewed said they would like to have some sort of support or teacher training in the use of technology in foreign language teaching.

We definitely need a support system for the use of technology during lessons. That is, full-time staff who can provide technical advice.

(01_M03_69–70, Translation mine)

If we had a person who could take care of technical problems in CALL classrooms, we could save a lot of time and concentrate on teaching.

(02_F06_96, Translation mine)

An instructor who wanted to have teacher training in the use of CALL said the following:

I am willing to use my pocket money, if I could have teacher training in the use of technology. But the university doesn't offer such training for staff.

(01_F05_73, Translation mine)

3.4.2 Summary of Interviews

In the interviews, it became clear that instructors use facilities in a limited way, adjusting their teaching styles or lesson plans to the environmental and technological settings in the classroom. In addition, many instructors believe that using computers for foreign language education is useful, but LL or CALL facilities are not necessarily utilized as intended and are often regarded as impeding face-to-face interaction between an instructor and his/her students. Instructors also tend to be excessively fearful in using technologies for teaching because system features and interface design of CALL facilities are extremely complicated. The following instructor's comment seems to summarize succinctly a dilemma that may be shared by many instructors in the Japanese EFL context:

If I could use technology appropriately during lessons, it could help my students understand better and I could make my lessons more appealing. But, in reality, I am just worried about using it in a way that goes beyond my current skills. I do not want to waste my time just on handling devices during lessons, so I use them as far as I can handle them.

(02_F01_31–33, Translation mine)

3.4.3 Classroom Observations

Case 1

Figure 3.9 shows the system setting of Case 1. The system was based on Sony's *LLC-9000*, which is one of the longest-lived and best-selling LL systems.

The system can handle six types of input resources such as (a) cassette, (b) VHS, (c) DVD (CD), (d) LD, (e) document camera, and (f) PC. The system can also handle six types of output resources such as (g) students' monitors, (h) students' headsets, (i) students' cassettes, (j) a room projector, (k) room speakers, and (l) an instructor's monitor. Accordingly, in this room, more than 30 input and output combinations are available, which makes operation extremely difficult (Figure. 3.10).
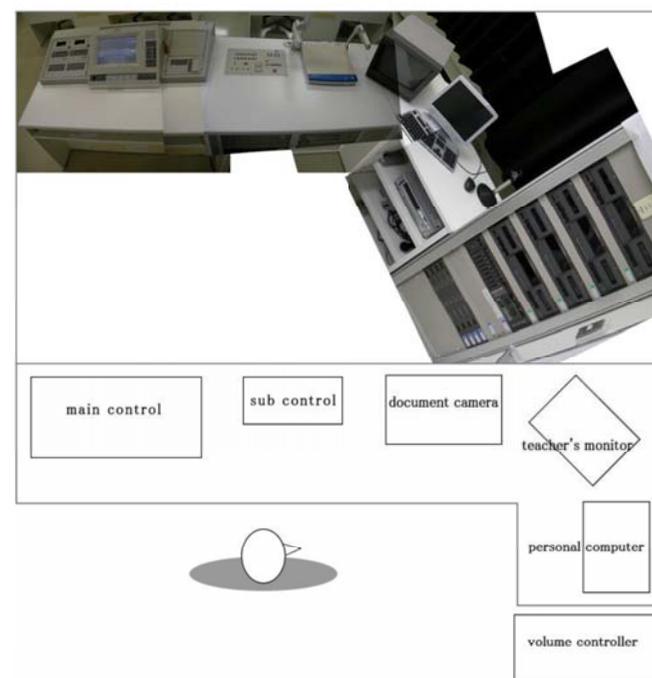

Figure 3.9. The picture shows the Case 1 system setting. To handle many input and output combinations, the system has the sub control unit. However, operation of the main control is not synchronized with the sub control unit, so that a teacher has to manipulate both units simultaneously to play video or audio devices.

This problem is evident when the instructor makes the shift from one device to another, for example, from a DVD to a PC. Table 3.2 shows the instructor's action and operation of the system while he was giving students a dictation task. He showed the students some scenes from a movie on a DVD, and the students tried to fill in the blanks on a handout provided. He gave the students some time so they could check their answers, and then he changed the input resource from a DVD player to a document camera to check students' answers. Although this is a very common teaching procedure that we often see and do in LL or CALL classrooms in the EFL context, the instructor had to go through five steps as quickly as possible with this system.

Table 3.2

A Procedure for the Use of an LL System during a Lesson

Time	Description of action	Equipment in use	Scene
0:13:07	Pause the DVD with the remote control.		
0:13:11	Put the handout on the document camera.		
0:13:16	Press the button on the main control's touch panel, and change the video resource from "VHS1" (DVD Output) to "VID1" (Document Camera Output).		

---

output resources

- video devices
  - students' monitors
  - teacher's monitor
  - room projector
- audio devices
  - room speakers
  - students' headsets
  - students' cassettes

control units

- main control
- sub control

input resources

- devices
  - cassette
  - VHS
  - DVD (CD)
  - LD
  - document camera
  - PC

Figure 3.10. The figure shows the system configuration of Case 1.

0:13:17	Press the "OK" button on the main control's touch panel, and confirm the video output resource.	
0:13:20	Press the button on the sub control unit, and change the video resource from "S-VHS" (DVD Output) to "書画" (named in Chinese Characters, "Document Camera").	
0:13:23	Give the students instructions: looking at the teacher's monitor.	

To play the DVD again, the instructor needed to go back through the same procedure. This back-and-forth action from the DVD to the document camera was observed 14 times during the lesson in this case. Even though the instructor got used to this operation, he made a mistake twice out of 14 in this lesson. In addition, consistent rules for labeling the buttons did not exist on the Case 1 system interface, so that different labels were printed on a pair of buttons such as "VHS1" on the main control and "S-VHS" on the sub control, or "VID1" on the main control and "書画" (labeled in Chinese Characters, "Document Camera") on the sub control, although both buttons in each pair refer to the same device (Figure. 3.11). Inconsistent interface design and labeling made operation much more difficult.

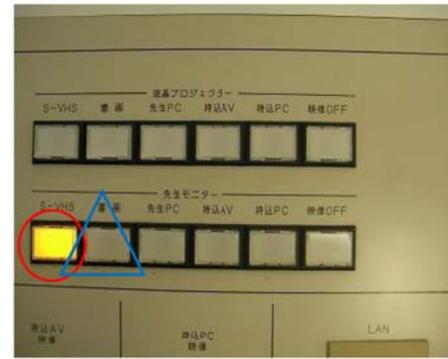*Figure 3.11.* The picture above shows the label configuration on the main control, and the picture below shows the label configuration on the sub control. A red circle in each picture shows the button of the same device (VHS player), but the device has a different name in each case. A blue triangle also shows the button of the same device (Document camera), which has a different name in each case.

Case 2

Figure 3.12 shows the system setting of Case 2. The system was designed based on Panasonic's *L Stage EZ*, which is one of the advanced CALL systems. The distinguishing feature of this system is that the system can send digitalized data such as CD sound files and DVD video files to the students' PCs, and the students' PCs can record data on their hard disk drives. Once recording is finished, the students are able to study on an individual basis.
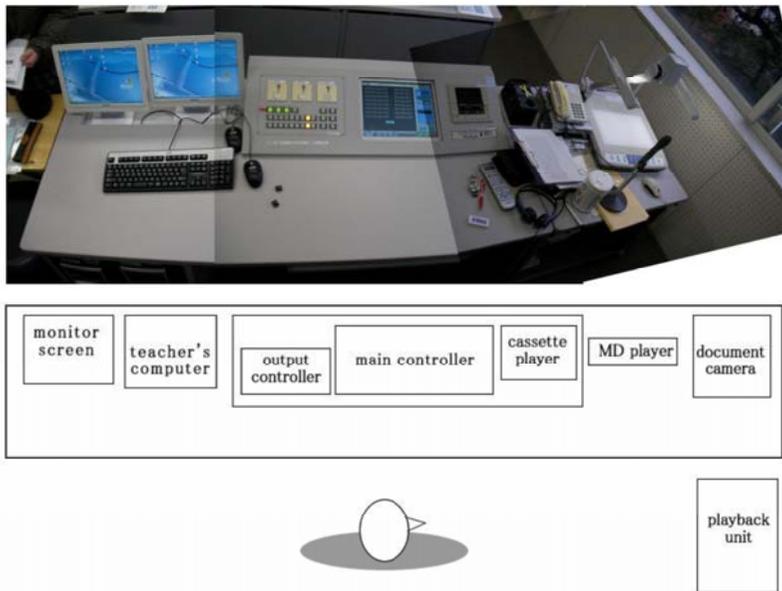
Figure 3.12. The picture shows the Case 2 system setting.

Because of the way that various components were installed, however, the system configuration has become extremely complicated. What made the system difficult to use was that the output-device unit (including CD, DVD, and VHS players), the input control unit, and the output control unit were all separately arranged around the instructor's console. Hence, the instructor had to manipulate three units to play just a single DVD in the classroom. In addition, each unit had a different interface design and inconsistent labels, so that the instructor needed to figure out the system setting every time. Table 3.3 shows the instructor's action and operation of the system while he was playing a DVD and trying to send the DVD's data to students' PCs and the projector.

Table 3.3

A Procedure for the Use of a CALL System during a Lesson

Time	Description of action	Equipment in use	Scene
0:19:22	Press the button on the main control unit, and select DVD as an input resource and students' PCs as an output channel.		
0:19:36	Press the button on the output control unit, and select the room projector and instructor's monitor as an output channel.		
0:19:53	Pause the DVD with the remote control.		
0:20:47	Press the button on the main control unit, and start recording. Start the DVD with the remote control.		

| 0:21:06 | Adjust the audio output level of the DVD with the volume-control slider on the output-device unit. | | |

3.4.4 Summary of Classroom Observations

The two cases described above are not exceptional. Creeping featurism, inconsistency of interface design and labeling, and cramped classroom settings were all observed in five universities wherein the classroom observation was conducted. These problems impeded the integration and normalisation of technology use within the classroom context.

The two cases also illustrate the current situation that exists in the use of technology in the Japanese EFL context: LL and CALL classrooms were developed to facilitate foreign language teaching, and educational institutions have paid a large amount of funding for that, but what we actually found was that the more the instructors tried to use technology installed in classrooms, the more the instructors faced difficulties in its use. Furthermore, the more the instructors used technology during the lessons, the more they needed to stick to the console unit to push countless buttons, and they thus had extreme difficulty in having face-to-face interaction with their students. In addition, without technical support and teacher training, instructors who would like to move forward in using technology for classes have few opportunities to improve their teaching practice and to become more acquainted with the possibilities of using LL or CALL facilities in language teaching.

3.5 Discussion

Through the interviews, three impeditive factors—(a) Technology factor, (b) Environment factor, and (c) Institution factor—became clear, and through the classroom observations, the question of how instructors' use of technology had been impeded in real classroom contexts was clarified.

The author suspects that the instrumental perspective (Warschauer, 1998), which views technology in isolation from the users and their contexts (G. E. Kerstern, Kersten, & Rakowski, 2004), can be a root cause of the dire situations illustrated in this study. If we base our teaching approach on that perspective, we can easily presume the usefulness of new technology and adopt it without considering the classroom contexts wherein teachers actually use technology in language teaching. Similarly, Bax (2003) criticized the instrumental perspective and called it "'Sole Agent' fallacy" (p. 26), which means that neglecting the factors indispensable for successful CALL implementation discourages its use in teaching.

The author believes these situations can be improved by taking an alternative perspective, an ecological one, into account in designing and implementing technology for language teaching (Bax, 2000, 2003; Chambers & Bax, 2006; Takeuchi, 2007a; Tudor, 2002, 2003). According to Tudor (2003), "an ecological perspective involves exploring language teaching and learning within the totality of the lives of the various participants involved, and not as one sub-part of their lives which can be examined in isolation" (p. 4). Therefore, an ecological perspective on the use of technology for foreign language teaching involves exploring language teaching within the totality of the context in which actual language teaching occurs (Warschauer, 1998).

In the light of Ecological Psychology, Gibson (1966, 1986) stated that the living animal and the environment are interrelated and never to be handled separately. He

argues that human action and perception are stimulated and embedded in a situation or a context, and objects or spaces that surround us always give us possibilities for action in a given context, in other words, "affordance." Based on this concept, Norman (1988) used affordance for analyzing the tools that we use in everyday life. From an ecological perspective of second language acquisition, van Lier (2004) proposed ecological linguistics and mentioned that language learning occurs as emerging from the context in which language learners are engaged and wherein they draw on affordance. According to him, affordance for language learning means "a relationship between an organism (a learner, in our case) and the environment that signals an opportunity for or inhibition of action" (p. 4). The common features of above mentioned studies are to identify actions and perceptions of human beings as a consequence of mutual interaction of person and the environment. In this sense, person and the environment are inseparable in a context (Thorne, 2003; Zukow & Ferko, 1994). Applying this idea to CALL research, it can be said that person (teachers and learners) and technology are interrelated in a classroom context.

Bronfenbrenner (1989) defined human development as "a joint function of person and environment" (p. 188), and formulated the theory based on Lewin (1935) as follows:[5]

$$D = f(PE)$$

According to Bronfenbrenner (1989), the "D" term refers to "development," the "P" term refers to "person," and the "E" term refers to "environment." "D" is a function of both personal and environmental factors. In a similar vein, the author believes that the use of technology in foreign language teaching cannot be discussed without the context, and should be integrated into the classroom context. To put into effect an ecological perspective with the foregoing in mind, the author would like to present an extended version of Bronfenbrenner's formula as follows:

$$U = f(PCT)$$

In this formula, the "U" term refers to the "use of technology in foreign language learning," the "P" term refers to "person," including teachers and learners, the "C" term refers to "classroom context," and the "T" term refers to "tools." The process of the use of technology in foreign language teaching can be described as a joint function of person, classroom context, and tools. By looking at the use of technology in our field by means of this formula, the author thinks that technology can obtain a "field of meanings" (Wenger, 1990) and be integrated into the classroom context.

In addition, to ameliorate the dire situations illustrated in this chapter, the author believes that CALL, which confines the use of computers to *inside the classroom*, should be shifted to TELL (technology-enhanced language learning), which extends the use of technology to *outside the classroom*. Considering the widespread use of information communication technology (ICT), it has become extremely difficult and unnatural for us to limit the use of technology to the inside of the classroom. Warschauer (2005) said that students now use new technology outside the classroom rather than inside. Similarly, Taylor and Gisaki (2003) mentioned that the traditional CALL lab is no longer the only place where students are exposed to authentic resources for language learning with the aid of technology. The author insists that a concrete pedagogical model, which considers the use of technology both inside and outside the classroom, while paying attention to integrating technology into the teaching practice, should be constructed.

Notes

1. The junior high school is a private school which has a fully equipped CALL classroom. The level of English language teaching at the school is extremely high. This is because the author included the instructor in the data pool.

2. TOEIC® scores ranging from 200–600.

3. In the Japanese EFL context, LL or CALL classrooms are usually designed to accommodate about 50 students.

4. Norman (1988) said "complexity probably increases as the square of the features: double the number of features, quadruple the complexity. Provide ten times as many features, multiply the complexity by one hundred" (p. 174).

5. Bronfenbrenner (1989) also reformulated the formula and redefined it as follows: "$Dt = f(t\text{-}p)(PE)(t\text{-}p)$." In this formula, the concept of "a particular point in time" (p. 190) was incorporated, where "t" referred to the time and "$t\text{-}p$" referred to period. By incorporating the dimensions of time, human development shifted from static outcomes to dynamic changes. According to Bronfenbrenner (1989), human development can be defined as follows: "The set of processes through which properties of the person and the environment interact to produce constancy and change in the characteristics of the person over the life course" (p. 191).

4. Model Selection and Practice Design

In this chapter, the rationales for model selection and the principles behind practice design are discussed in detail.

4.1 Selecting a Model

Based on the ecological perspective discussed in Chapter 3, the "cyclic model of learning" (hereafter CML, Takeuchi, 2007b) has been chosen as a mainstay in the design of a teaching practice. The CML is based on the ecological perspective, with special focus on the local context, that is, Japanese EFL classrooms.

The most distinctive feature of the CML is that it integrates in-class teaching practices with outside-the-class students' self-learning with the aid of web technology. In addition, the CML attempts to elicit students' participation in lessons and promote outside-the-class students' self-learning, both of which are considered to be indispensable for successful EFL learning (Takeuchi, 2002b).

It is true that some CALL practices have adopted a model similar to the CML. For example, van Deusen-Scholl, Frei, and Dixon (2005) identified the advantage of using online resources: "One in-class activity determines its continuation online, and the online activity determines the following in-class activity. This cycling—or spiraling—builds the foundation for on-going reflection of language production and complexity" (p. 661). Similarly, Levy and Kennedy (2004) employed audio-conferencing tools as a means of speaking in the target language outside scheduled class time, which they call the "task-cycling approach." The CML, however, is thought to be the best model for this dissertation project because it is carefully conceptualized in the Japanese EFL context, examining how the process of foreign language teaching actually occurs at schools in Japan (Takeuchi, 2002b).

In the CML, the process of foreign language teaching cannot be divided into a series of single in-class lessons, but is considered to be a cumulative result of both each in-class lesson and students' outside-the-class self-learning. As van Lier (1998) argues in reference to Breen (1985), "a genuine second-language learning environment in which language development primarily occurs (is) outside the classroom, but can be intensified and consolidated inside it" (p. xv, parenthesis the author's). Also, van Lier (1996) insists, "the more lessons I observe, the more I become convinced that language development occurs *between* lessons rather than *during* lessons" (p. 43, italics original). These remarks seem to support the main idea stipulated in the CML that two distinctive but interrelated flows are necessary in the teaching process. These two flows are (a) a teaching flow within a lesson, which means how an instructor conducts one lesson, and (b) a teaching flow between lessons, which connects one in-class lesson with the next lesson via web technology. These two teaching flows create the classroom context, in which actual language teaching and learning occur. Figure 4.1 presents an overall picture of the classroom context in this model.

In the CML, furthermore, the preparation and the reflection phases are placed before and after each lesson (a) to facilitate "the teaching flow within a lesson," (b) to reinforce "the teaching flow between lessons," and (c) to connect these two teaching flows (Figure 4.2). In the preparation phase, web technology is used to provide resources that are related to the lesson in order to activate students' schema and ready them for the lesson. In the lesson, the instructor facilitates students' use of the target language and elicits students' participation in classroom activities (without using technology). In the reflection phase, students are guided to review the lesson through the resources provided on the web page.
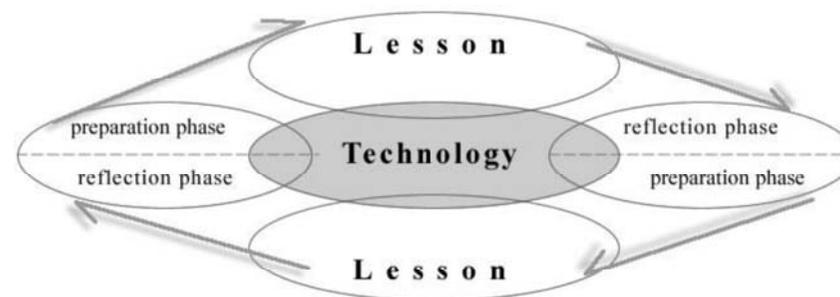
Figure 4.2. This figure shows a schematic representation of the CML.

The CML also makes it possible to expand time and space for teaching (Sumi, Takeuchi, Yamamoto, & Nabei, 2005). The extension can often reinforce students' commitment to the class and thus facilitate their voluntary learning outside the class. To learn English in the Japanese EFL context, self-learning beyond school lessons is essential. According to Saegusa (1985, 1993), in order to reach Level 3 on the Foreign Service Institute Scale,[1] 1,920 to 2,280 hours of learning English is mandatory. This means that if a student starts learning English from the first year of

Figure 4.1. An overall picture of the classroom context.

lower secondary school (7th grade)[2] and finishes it at the end of university, the number of learning hours needed to reach Level 3 would be 2.5 times that required in schools in the Japanese EFL context. However, if we effectively utilize time between lessons, and use the resources provided by means of technology outside the class, we can expand the learning hours manifold. The author thus believes that the CML can be an effective solution for ameliorating the major disadvantage of learning English in the Japanese EFL context, that is, a dearth of learning hours.

4.2   Designing the Teaching Practice

To design a teaching practice based on the CML, the author first took into consideration the three factors found in Study 1. He then consulted with the instructors in charge of the class where the practice was to be implemented (Chapters 5 and 6) to learn the purposes of the class and the teaching methods of the instructors. After these procedures, the author designed the teaching practice.

To ameliorate the technological impeditive factor, all the technologies were removed from the classroom. It was determined to use a Learning Management System (hereafter, LMS) instead of typical LL or CALL facilities and to let students use it outside the classroom.

According to W. R. Watson and Watson (2007), the LMS has developed out of integrated learning systems (ILS) and is defined as "the framework that handles all aspects of the learning process" (p. 28). Although it seems impossible to quote a standardized definition of LMSs because of the growing number of sub-types, their main features can be summarized as Web-based infrastructures that serve to supplement in-class instructions and allow teachers to incorporate students' self-learning into classroom activities (Kung & Chuo, 2002; Lee, 2000; Sumi, et al., 2005; Szabo & Flesher, 2002). An LMS named *CEAS* (*Coordinated Education*

Activation System) was used in the studies to be reported in Chapters 5 and 6. *CEAS* is one of the most well-known open-sourced LMSs used by many universities in Japan (Arakawa, Ueki, & Fuyuki, 2004). The system was developed to support lecturers' delivery of learning materials to students (Fuyuki, Tsuji, Ueki, Arakawa, & Kitamura, 2004) and is highly compatible with the framework of the CML. It is also relatively easier for language teachers to handle than other elaborated systems, for example, *Blackboard* and *WebCT*.

To ameliorate the environmental impeditive factor, an ordinary classroom, instead of the cramped LL or CALL classroom, was used. The ordinary classroom used in this project was equipped with neither computers nor audio/visual facilities. Desks and chairs in the classroom were movable, so that students could easily form groups during lessons. Enough space was also available for smooth interaction between an instructor and his/her students, so that the instructor could easily walk around.

To mitigate the institutional impeditive factor, a teaching assistant (TA), who is well versed in technology and EFL teaching, was chosen, so that he could give technological advice and supports to the instructor in charge.[3]

In the next two chapters, the author reports on how the teaching practice described above were implemented and what kinds of effects the practice had on the improvement of the students' English ability and the manners in which the instructors conducted the lessons.

Notes

1. This scale was originally developed by the United States Foreign Service Institute and represents the average English proficiency level of non-native speakers. It consists of eleven major ranges of proficiency, beginning with Level 0 (no functional ability in the language) to Level 5 (native or bilingual proficiency). Designations "+" are used between levels (Saegusa, 1985).

2. Students in this study started learning English in the first year of junior high school.

3. For the convenience of data collection, the author participated in the two studies to be reported in the next two chapters as a TA. He has an MA in the field of education and has a long experience in using computers. He is well versed in web technology, too.

5.   Study 2

5.1   Purposes

The purposes of Study 2 are (1) to conduct the CML-based teaching practice in a real educational context over an extended period, and (2) to investigate the efficacy of the teaching practice quantitatively and qualitatively. The efficacy of the teaching practice is investigated in relation to (a) the improvement of students' English ability and (b) the manner in which the instructor in charge conducts lessons.

5.2   The Study

5.2.1   Participants and the Course

The teaching practice based on the CML was tested on 19 (4 males and 15 females) 1st-year undergraduate students for one year from April 2005 to March 2006. The class was one of elective required courses open only to students who would like to take advanced English lessons. Their English ability was relatively high for college students with the TOEIC® score range of 500 to 600 and they were highly motivated.

The instruction in charge of the course had over 20-year teaching experience and held a Ph.D. and two MAs in language teaching and its related fields. His mother tongue was Japanese, but had a high proficiency of English with almost the full score on the TOEIC® and the TOEFL® tests.

The purpose of the class was to improve EFL students' reading ability. One lesson was held for 90 minutes once a week, and there were 13 lessons in each semester, which means that there were 26 lessons in a year. The lessons were given in an ordinary small-size classroom with no computers/AV facilities and mainly

conducted in English. The classroom had portable chairs with flat writing tables, so that students could easily move them to form seating for pairs or groups (Figure 5.1).

Figure 5.1. A snapshot of one lesson.

5.2.2 The Teaching Practice

In the CML-based teaching practice, three phases were designed and a role was given to each phase after an extensive consultation with the instructor in charge.

The "pre-lesson" is the first phase. The aim of this phase is to activate students' schema and ready them for learning. For this purpose, the preview materials were posted on the LMS, so that students were able to use them by logging onto the LMS before the lesson. Figure 5.2 shows an example of the opening page of the preview materials.

On the opening page, background information and reading strategies that helped students understand the content of the textbook were provided. In addition, on both sides of the opening page, there were two columns. In the left side column, icons linked to the digitalized textbook were placed and they were labeled "Read 01" and "Read 02." The division of "Read 01" and "Read 02" was decided in accordance with the quantity of texts. By clicking the icons on the opening page, students could visit the digitalized reading material and read it while listening to the narration in English

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(see Appendix A). In the right side column, several external links to the websites (in English) related to the textbook contents were posted with images, so that students could deepen their knowledge beyond the contents of the textbook and expose themselves to authentic English. Figure 5.3 shows the layout of the learning materials on the LMS.
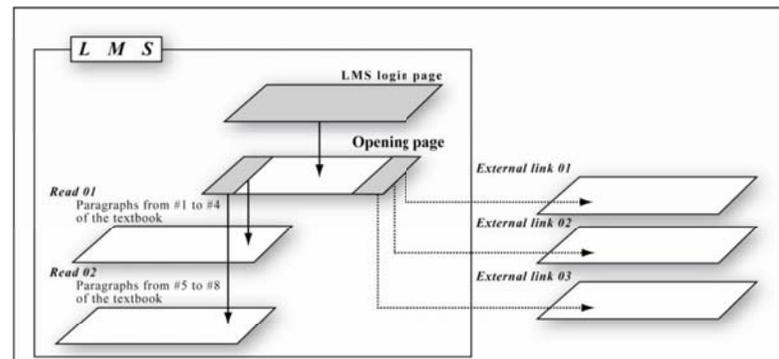

Figure 5.2. An example of the opening page.

Figure 5.3. The layout of the learning materials on the LMS.

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The second phase is the "lesson," in which the instructor in charge gave a lesson in an ordinary small-size classroom. The main focus of this phase was to elicit students' participation and utterances in the target language. Collaborative activities such as group work, pair work, and group competition were introduced to facilitate both instructor-student and student-student interactions.

The last phase is the "post-lesson." The main focus of this phase was to give students both review and additional study materials on the LMS and to guide them to the next lesson. All materials were developed and posted on the LMS by the author through consultations with the instructor who was the practitioner of this class. The author also participated in every lesson and worked as a TA (Teaching Assistant); soon after the lesson, using the notes and recorded video tapes from class, he made materials that reflected the contents of the lesson and posted them on the LMS as materials for review and additional study. These materials included the important review points of the lesson and some additional information concerning the reading materials. Figure 5.4 shows an example of the supplemental materials (see Appendix B for more supplemental materials).

At the beginning of each lesson, a quiz was given to assess students' understanding of the previous lesson, so that students were naturally guided to using the materials posted on the LMS for reflection since some important points that might be asked in the quiz were summarized in the materials on the LMS. Figure 5.5 shows how the three phases worked together with the aid of the LMS.

Figure 5.4. An example of the supplemental materials that were made, based on the content of each lesson.
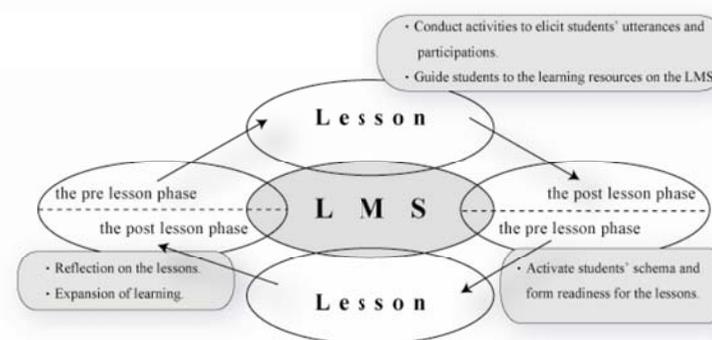

Figure 5.5. A schematic representation of the CML applied to this study.

5.2.3 Data Collection and Analysis

To examine the influence of the teaching practice on (a) the improvement of students' English ability and (b) the manner in which the instructor conducts lessons, data were collected in a variety of ways based on the concept of triangulation. Triangulation is one of the research methodologies that make it possible to examine the complex structure of practices from multiple sources (Dörnyei, 2007; Takeuchi, 2003).

To investigate the influence of the teaching practice on the improvement of students' English ability, a reading section of the FCE (First Certificate in English), which is a standardized ESL test developed by University of Cambridge ESOL Examinations, was administered. The scores on this test are considered to be a reliable indicator of general reading ability (Chalhoud-Deville & Turner, 2000).

The test was administered four times a year at the beginning and end of each semester. The same test was used four times. The order of multiple choices in each section of the test, however, was changed each time. The question and answer sheets were collected each time, and there was a relatively long interval between each administration of the tests. Also, no advance notice was given that the same test would be used again. The test scores were analyzed by using nonparametric statistical analysis since there were only a small number of students and the normality of the data was not guaranteed (Siegel, 1956).

The relationship between the number of access log entries and sum total of the quiz score of each student was investigated to examine whether there was a correlation between them. The quizzes were conducted at the beginning of each lesson to examine students' understanding of the previous lesson so that the quiz score was considered to be a measurement of their achievement. Access log entries were automatically counted when a student logged onto the LMS system and used the materials. The frequency of the access log entries was an indicator of how often a student logged onto the LMS and used the materials for self-learning.

To investigate the influence of the teaching practice on the manner in which the instructor conducts lessons, qualitative data from video recordings, field notes taken during the lessons, a questionnaire, and interviews were collected. Video data were categorized to explore how the instructor conducted the lesson. There were a total of 13 lessons in each semester, and they were equivalent to 39 hours of study. However, data from the lessons used for the orientation of the class, tests, and a guest speaker session were omitted, and 24 hours of data thus were used for categorization. In order to divide video data into categories objectively, inter-rater reliability of 20% of the data analysis was calculated between the author and a postgraduate student who is majoring in foreign language education. The inter-rater agreement was at 85.0%. The author decided that the result was at an acceptable level (Potter, 1996). Disagreements between the raters were discussed and resolved. The questionnaire (see Appendix C) included 77 items asking about (a) lessons (26 items), (b) self-evaluation (7 items), (c) instructor (6 items), (d) friends (7 items), (e) teaching assistant (6 items), and (f) LMS (25 items). The questionnaire was designed by the author in consultation with the instructor in charge. A 5-point Likert scale (5. Absolutely agree, 4. Agree, 3. Somewhat agree, 2. Disagree, and 1. Absolutely disagree) was used in this questionnaire. Cronbach's alpha was .82, which suggested strong consistency. All data related to Study 2 were collected with the permission of the instructor and the students involved.

5.3 Results

5.3.1 Students' English Ability

Table 5.1 shows the results of the reading section of the FCE test. The full score of the FCE test was 35. Data for only 17 students were analyzed as two students were absent on one of the test days. The Friedman test was conducted to identify the overall differences among the four tests and a significant difference was found ($x^2 = 15.93$, $p <. 01$, $r = .38$). The improvement of students' proficiency level in English was thus confirmed.

Table 5.1

Results of the FCE Tests

FCE	N	M	SD	Min.	Max.	Mdn
1st	17	17.41	3.86	10	24	17
2nd	17	20.82	2.24	13	24	22
3rd	17	22.35	3.92	13	27	23
4th	17	22.94	3.80	14	28	24

To conduct in-depth analysis, the students were divided into two groups based on the results of the 1st FCE score. The cut-off point was 17 ($M = 17.41$, $SD = 3.86$), and the Mann-Whitney U test was applied to evaluate whether there was any significant difference in proficiency between the two groups. A significant difference was found ($U = 0$, $p < .01$, $r = -.85$). The two groups were thus designated group H [high score group ($n = 8$)] and group L [low score group ($n = 9$)] (Table 5.2).

The Wilcoxon signed-rank test was used to analyze the difference between the 1st FCE and the 4th FCE results in each group. A significant difference was found in group L ($T = 1$, $p < .01$, $r = -.61$), but not in group H ($T = 3$, $p > .05$, $r = -.47$) (Tables 5.3 & 5.4).

Table 5.2

Grouping of the Students Based on the 1st FCE Score ($N = 17$)

Group H/L	St. ID	1st FCE Score	Rank
H	M02	24	1
H	F16	23	2
H	F03	21	3
H	M04	21	3
H	F04	20	5
H	F05	20	5
H	F07	20	5
H	F10	18	8
L	F11	17	9
L	F02	16	10
L	F12	15	11
L	F14	15	11
L	F15	15	11
L	F01	14	14
L	M03	14	14
L	M01	13	16
L	F09	10	17

Note. H = high score group. L = low score group. St. ID = Student identification data. The students in group L are highlighted.

Table 5.3

Students' Scores in Group L on the 1st and the 4th FCE Tests ($n = 9$)

Group L	St. ID	1st FCE Score	4th FCE Score
L	F11	17	23
L	F02	16	28
L	F12	15	24
L	F14	15	17
L	F15	15	14
L	F01	14	26
L	M03	14	21
L	M01	13	26
L	F09	10	22
	M	14.33	21.78
	SD	1.89	4.05

Note. L = low score group. St. ID = Student identification data.

Table 5.4

Students' Scores in Group H on the 1ˢᵗ and the 4ᵗʰ FCE Tests (n = 8)

Group H	St. ID	1st FCE Score	4th FCE Score
H	M02	24	24
H	F16	23	22
H	F03	21	27
H	M04	21	24
H	F04	20	24
H	F05	20	26
H	F07	20	19
H	F10	18	28
	M	20.88	24.25
	SD	1.76	2.68

Note. H = high score group. St. ID = Student identification data.

In addition, the Mann-Whitney U test was applied to evaluate whether there was any significant difference between the two groups in the 4th FCE results. No significant difference was found ($U = 22$, $p > .05$, $r = -.33$). This result suggests that the students in group L notably improved their English ability and increased their test scores. As a consequence, the average score of the two groups was fairly close on the 4th FCE test administration.

Table 5.5 shows the sum total of quiz scores and the number of access log entries of each student. To identify the correlation between the two sets of variables, the Spearman rank-correlation was used, and the results indicated that there was a relatively strong relationship between them ($r_s = .61$, $r^2 = .37$). It is thus possible to maintain that the number of times that the students visited and learned on the LMS might have had an influence on the scores of quizzes that represented students' achievement.

Table 5.5

Students' Quiz Scores and Total Number of Times Accessing the LMS (n = 17)

St ID	Quiz score	Number of times accessing
F01	109.50	41
F02	128.00	71
F03	125.50	58
F04	92.50	26
F05	105.00	18
F07	106.10	42
F09	127.10	56
F10	128.40	24
F11	105.00	29
F12	115.50	26
F14	87.10	33
F15	70.60	25
F16	120.60	53
M01	52.50	20
M02	98.50	14
M03	78.24	14
M04	96.00	10

Table 5.6 summarizes the number of access log entries and the FCE gain scores of each student. The FCE gain score was calculated by subtracting the 1st FCE score from the 4th FCE score. The Spearman rank-correlation was again used, and there was only a weak correlation between the two sets of data ($r_s = .14$, $r^2 = .02$). However, by omitting the data set on group H and then analyzing group L data in the same way, a relatively strong correlation between the access log entries and the raw gain scores was found ($r_s = .59$, $r^2 = .35$). This result suggests that the number of times that the students used the LMS for learning might have had an influence on the FCE gain scores in group L.

Table 5.6

Total Number of Times Accessing the LMS and FCE Gain Scores (n = 17)

Group H/L	St ID	Number of times accessing	FCE gain
H	M02	24	0
H	F16	53	-1
H	F03	58	6
H	M04	10	3
H	F04	26	4
H	F05	18	6
H	F07	42	-1
H	F10	24	10
L	F11	29	6
L	F02	71	12
L	F12	26	9
L	F14	33	2
L	F15	25	-1
L	F01	41	12
L	M03	14	7
L	M01	20	8
L	F09	56	12

Note. The students in group L are highlighted.

5.3.2 Changes in the Instructor's Way of Conducting Lessons

A part of the Grounded Theory Approach procedure (Corbin & Strauss, 2008, Chapters eight and nine) was used to classify the lessons' video data. As a result, the following four categories were generated:

1. Quiz

2. One-way Instruction

3. Interactive Instruction

4. Activity

"Quiz" was used to categorize the period of time in which quizzes were conducted at the beginning of each lesson. "One-way Instruction" was used to categorize the period of time in which the instructor elaborated on the reading materials or related issues in one-way instruction in English. "Interactive Instruction" was used to categorize the period of time in which the instructor asked questions and students answered his questions, or students asked questions and he answered them. In other words, in this period of time, interactions between the instructor and students were observed. Lastly, "Activity" was used to categorize the period of time in which students conducted some kinds of activities related to the lessons, such as sharing information about the reading materials, or helping each other understand the materials. Table 5.7 shows the result of categorization of the video data.

Table 5.7

Categorization of Video Data

	Quiz	One-way Instruction	Interactive Instruction	Activity
First semester [h:m:s]	2:30:16 (18.55%)	4:33:47 (33.80%)	2:44:14 (20.28%)	3:41:43 (27.37%)
Second semester [h:m:s]	2:09:46 (20.60%)	3:44:12 (35.59%)	3:06:18 (29.57%)	1:29:44 (14.24%)
Total [h:m:s]	4:40:02 (19.45%)	8:17:59 (34.58%)	5:50:32 (24.34%)	5:11:27 (21.63%)

Note. h = hour. m = minute. s = second.

As Table 5.7 shows, the way in which the instructor conducted the lesson seemed to be fully interactive and cooperative. The period of time that the instructor spent on "Interactive Instruction" accounted for 24.34% of the total lessons time. In the time for "Interactive Instruction," students spontaneously uttered their opinions

in answer to the instructor's questions and he helped them complete their utterances in English in a variety of ways by offering scaffolding. In addition, the period of time for "Activity," in which students were allowed to learn individually or cooperatively amounted to 21.63% of the total lessons time. The amount of time for "Interactive Instruction" and "Activity" together accounted for 45.97% of the total lessons time.[1]

Below is a scene from a lesson, which was categorized as "Interactive Instruction." At the beginning of the lesson, the instructor asked a student a question related to the topic of the reading materials in the textbook.

Instructor: *What questions do you want to be asked?*

Student: *About travel.*

Instructor: *About traveling, OK. Do you like traveling very much?*

Student: *Yes.*

Instructor: *Why do you want to be asked about traveling?*

Student: *I have many places to visit…*

Instructor: *Ah-ha, you have many places that you want to go.*

Student: *So, I want to be asked about it.*

Instructor: *Where do you want to go?*

Student: *New Zealand.*

Instructor: *Why do you want to go to New Zealand?*

Student: *Because I heard the country is safe. I know some people from New Zealand. They are great people.*

Instructor: *OK, the country is said to be safe. I don't know exactly, but the country is safe and people from there are nice to you.*

In this interaction, the instructor helped elicit the student's utterances as much as possible and offered scaffolding to facilitate the interaction. First, the instructor gave an open question to the student, and she simply answered the question. Second,

as soon as the instructor heard the student's answer, the instructor swiftly asked a follow-up question correcting her utterance, and gave her another opportunity to answer his question: *"Why do you want to be asked about traveling?"* Third, he offered scaffolding to help her complete her sentences in English: *"Ah-ha, you have many places that you want to go."* With the help from the instructor, the student could complete her utterance, and lastly the instructor gave the student and class feedback on the student's comment, which helped her understand what exactly she wanted to say in English: *"OK, the country is said to be safe. I don't know exactly, but the country is safe and people from there are nice to you."* These "interaction frames" (Fogel, 1993), which started from a simple "Question and Answer" phase and finished at a "Feedback" phase through a "Scaffolding" phase, were observed many times during the lesson and created the teaching flow in lessons.

In another case, the instructor helped a student complete her utterances giving scaffolding in many ways. In addition, other students sitting around the student were empathetic toward her, even though her English was not clear and was mixed with Japanese. The topic of the reading material on the day was *A Close Encounter with a UFO.*

Instructor: *Have you ever seen UFOs? Anybody who has ever seen UFOs, please raise your hand?* [The instructor gave students an open question.]

[Students were looking at each other.]

Student: 見たことは無いけど…… なんか、変な…… (間)
[I have never seen a UFO, but I had a strange experience… (pause).] [A student started answering the instructor's question in Japanese and other students turned to the student.]

| Instructor: | *Tell me your experience.* | [The instructor encouraged the student to speak.] |

Student: えっと、*When I was* (間) 何やろう、*4年生？*
[Well, when I was (pause), well, a 4th grade pupil.]

Instructor: *When you were a 4th grade pupil.*
[The instructor helped the student complete her utterance in English.]

Student: *When I was a 4th grade pupil, in the morning, I had a teacher's story.*
[The student repeated her utterance in English and tried to add sentences. Other students were nodding at her utterance.]

Instructor: *Oh, you heard your teacher's story.*

Student: *No.*

Instructor: *Oh, sorry. OK.*

Student: えっと、*It was summer.*
[Well, it was summer.]

Instructor: *It was summer.*

Student: ここを見たら (肩を指差しながら)。
[When I looked at here (pointing at her shoulder).]

Instructor: *Yes.*

Student: [pointing at her shoulder]
I watched…

Instructor: *Yes, you just watched your shoulder.*
[The instructor repeated her utterance in English giving feedback.]

Student: *Shoulder, No.*
[touching her arm]

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Instructor: *Your arm.*

Student: で、ここに、*stars marks*
[Then I saw stars marks.]
[Other students also looked at their arms.]

Instructor: *You had a star, an astral signal here?*

Student: *Star mark?*

Instructor: *You had a star, a star sign here?*

Student: 掘り込んだような……
[It was a kind of engraved mark.]

Instructor: *Wow, you mean this kind of star?*
[The instructor started drawing a star on the whiteboard in a hexagonal shape.]

Student: *No, five.*

Instructor: *Five?*
[The instructor was confused.]

Student: *Like this.*
[The student drew a star on a notebook and showed it to the instructor. The instructor came close to her and saw the star]

Instructor: *Ah*
あれ、こうか？
[Well, how does it go?]
[The instructor started drawing a star again, but he could not draw it well.]

Students in chorus: え〜、先生、星、描けない
[Oh, you can't draw it, can you?]

Instructor: *Yes, I got it! This is the star. Yes! And you had a star mark here, on your arm.*
[The instructor followed the students' advice and started drawing a star again on the whiteboard.]

Student: で、びっくりして、何これって思って。
[Then I was surprised at it and thought what…]

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Instructor	*Disappeared soon?*	
Student	びっくりして、なにって思って、で、こうやってもとれないし。で、先生にめっちゃ怒られて、何でそんなところかいてんのって。それですごい覚えてて。 [I was so scared and scraped my arm quickly, but the teacher scolded me for not concentrating on his lesson.]	[All students laughed.]
Instructor	*OK, what XXX-san* [Student A] *wants to share with us is ⋯.*	

<div align="center">

Continued   (Translation mine)

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At the end of the interaction frame, the instructor summed up her story and gave the class feedback on her story in correct English. Scaffolding that the instructor offered the student was essential for her to complete her statement in English. In addition, other students who were sitting around her encouraged her to continue her story, displaying empathy.

These examples of the interaction observed in the class show that the teaching practice based on the CML ameliorated factors that hinder smooth interaction in the classroom, and allowed the instructor to conduct many student-centered activities while offering scaffolding to the students. As a result, the instructor successfully facilitated the student's use of the target language and elicited her participation in classroom activities.

Figure 5.6 represents a teaching flow in a lesson, with categories in four colors. As this figure shows, "One-way Instruction" and "Interactive Instruction" occurred alternately during the lesson, and the "Interactive Instruction" phase worked as a vehicle to push the teaching flow forward.
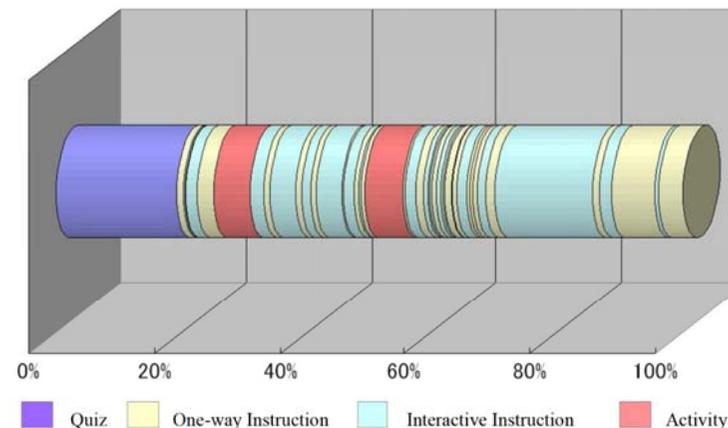

Figure 5.6. The horizontal bar represents the teaching flow in a lesson. The duration of a lesson, 90 minutes, is converted to a percentage.

Concerning the question as to why the instructor could spend sufficient time on interactions and student-centered activities during the lesson, the instructor commented in the interview as follows:

Since I started using the LMS in connection with the lesson, I was able to divide the contents into what I should teach during (in-class) lessons and what I can let the students study on the website. As a result, I was able to offer many student-centered activities within the lesson and give the students many opportunities to speak up English.

<div align="right">

(Translation mine)

</div>

In another part of the interview, he also commented as follows:

I think the amount of time available for activities within a lesson drastically increased with the aid of the LMS, and the students seemed to enjoy learning and speaking up English in activities. I also think that these positive experiences that the students had in activities helped them maintain their study of English throughout the course. These positive experiences also might have become the students' motivation for visiting the LMS after each lesson.

(Translation mine)

These comments, along with many similar comments obtained, indicates that his way of teaching changed after adopting the CML-based teaching practice.

The students also gave positive feedback on the CML-based teaching practice in response to the questionnaire. To the question item, *Do you think it was good to do activities in the lesson?*, 94.7% of the students ($n = 18$) responded "Absolutely agree" and "Agree." In addition, to the question item, *Do you think there were sufficient opportunities to give your opinions in the lesson?,* 89.5% of the students ($n = 17$) responded "Absolutely agree" and "Agree."

5.4 Discussion

The results described above suggest that the teaching practice based on the CML, which is designed from the ecological perspective, had positively influenced the improvement of students' English ability and the manner in which the instructor conducted the lesson. Also, the CML-based practice expanded time and space for the class, and the instructor could use the resources on the LMS as an "extended learning environment" (van Deusen-Scholl et al., p. 657), dividing the syllabus between what he should teach in-class and what the students could study on the website. As a result, he could spend sufficient time on student-centered activities in the lessons and give many opportunities to the students to speak English. The time and opportunities used for student-centered activities in the class might contribute to eliciting the students' participation in the lesson and to effectively guiding them to the learning materials on the LMS. This learning cycle seemed to help increase the students' learning hours outside the lesson, which is indispensable for EFL learning, especially in the Japanese EFL context (Takeuchi, 2002b). In addition, the instructor's way of conducting lessons might contribute to creating positive relationships among the students. Especially for the students in group L, this relationship helped them voluntarily participate in classroom activities.

In this study, however, the improvement of the students in group H was not statistically apparent. A few students in group H even scored minus points (although not significantly) in the raw gain result of the FCE tests, although their performances in relation to the number of access log entries and quiz scores was similar to that of the students in group L. This may be because the ceiling effect influenced the group H students' performance on the FCE test scores.

5.5 Summary of Study 2

In this study, through a series of quantitative analyses, a relatively strong relationship of students' use of the materials on the website to the quiz scores (i.e., achievement) and to the improvement of their English language proficiency was found in group L. In addition, the results indicated the instructor's way of conducting lessons had been positively influenced. Based on these results, the efficacy of the CML-based teaching practice was confirmed. However, the present study has limitations, which made the conclusions drawn from it tentative rather than definitive. The major limitations are (a) the participants' English level was

relatively high and (b) the number of students was small. In the next study, thus, the CML was tested on a large number of students whose English abilities are varied and basic.

Note

1. The amount of time for "Interactive Instruction" and for "Activity" together accounted for only 35.0% in other courses examined to obtain the baseline data for comparison. Although this figure was informal, we can notice that there was a huge difference between the course described in this chapter and others.

6. Study 3

6.1 Purposes

In Study 3, the author investigated the applicability of the teaching practice developed in Study 2 to an environment that better represents the Japanese EFL context. The environment was a Japanese public lower secondary school.

6.2 Participants

The participants in this study were 50 male and 43 female second-year public lower secondary school students aged 13–14 years. Their school is located in southern Osaka, western Japan, in the center of a newly developed residential area. The students had been learning English for one year prior to the study. Extrinsic motivation for learning English seemed to be moderate, because there was still one year to go before the entrance examination to high schools. Eighty-three students (89.25%) had Internet-connected computers at home as of 2008 when the study was conducted. According to the data from the Ministry of Internal Affairs and Communications (2004), 68.5% of households in Osaka have Internet-connected computers, and hence, the number of students who have Internet-connected computers was slightly higher than the average of Osaka. During the research period, the school's computer room was opened for five days after school hours. The availability of computers thus was guaranteed for all the participants.

The teacher who participated in this research had been teaching English at the school for ten years and had seven years of teaching experience at other schools. His basic attitude to teaching English was relatively student-centered. He often participated in workshops or seminars for teacher development.

6.3 Adjusting the Teaching Practice

To adjust the teaching practice developed in Study 2 to better fit the new situation, the process of carefully exploring the classroom context was conducted.[1] In the process, the author investigated the teacher's concerns, how lessons were designed and conducted by him and what difficulties he had experienced in conducting lessons. A teaching cycle, which means how one in-class lesson connects with the next, was also investigated.

6.3.1 Classroom Observations

Through the classroom observations, it became clear that the teacher was trying to cram many exercises into one 50-minute lesson. For example, in a lesson, the teacher needed to explain the pronunciation of new words and to give the Japanese meaning of them. In addition, the teacher was asked by his students to explain the materials in the textbook in English and Japanese. As a result, the lesson seemed to be overloaded with exercises, and consequently, one-way instruction occupied a greater part of the lesson.

In the Japanese EFL context, teacher-centered instructions derived from the grammar translation method are still common (Fenton, 2006; Takeda, 2007). As a result, one-way instruction for imparting Japanese translations of the textbooks to students tends to absorb the greatest part of the lesson, and students are accustomed to learning in a passive manner. To avoid spending time on giving just one-way instruction and to let the students speak up in English as much as possible in the lesson, the teacher in charge had started using an original type of material called a "Chunk-Sheet" in the lesson. The sheet was developed by the teacher for oral reading activities. Oral reading, that is, reading-aloud activities, has been popular

among junior high school teachers in Japan as a way to internalize the input from the textbook (Hayashi, 2007; Suzuki, 1998; Tai, 2002).

To make the Chunk-Sheet, the teacher extracted important sentences from the textbook and divided them into chunks in line with a group of words. English sentences extracted from the textbook were printed on the left side of the sheet and Japanese translations were printed on the same line to the right of the English sentences. Figure 6.1 shows an example of the sheet (see more samples in Appendix D).

		2年：Homestay in the United States (Unit 4—R①···P42) 50語
1		(Nana) Everyone in my host family is nice
2		to me.
3		But my host mother always gives me
4		too much food.
5		Do I have to eat everything?
6		It's too much
7		for me.
8		(Teacher's Answer) You must tell your host mother.
9		Say,
10		I'm sorry.
11		It's very good,
12		but I can't eat that much."
13		She'll understand.

		2年：Homestay in the United States (Unit 4—R①···P42) 50語
1		(Nana) わたしのホストファミリーはみんな親切です
2		わたしに対して
3		でもお母さんはいつもわたしにすすめます
4		多すぎる食べ物を
5		すべて食べないといけませんか？
6		多すぎます
7		わたしにとって
8		(Teacher's Answer) お母さんに言わなければなりません
9		～と言いなさい
10		「すみません。
11		とてもおいしいです
12		でもそんなには食べられません。」
13		お母さんはわかってくれますよ

Figure 6.1. A sample of the "Chunk-Sheet." In the lesson, the students fold it in half and read orally from the sheet.

With the sheet, the teacher conducted reading-aloud activities during the lesson and allowed the students to read out the sheet in a variety of ways. For example, in the "Read and Look-Up" activity, the students looked briefly at one English sentence on the sheet and then read the sentence aloud without looking at the sheet, so that they could increase their retention of English sentences.

Initial classroom observation suggested that the sheet was effectively used and the students were making progress in the activity. However, several subsequent interviews and e-mail exchanges with the teacher in charge revealed that he was

experiencing difficulty in eliciting students' self-learning through preparation and review of the Chunk-Sheets at home. He was also experiencing difficulty in making a linkage between in-class lessons and out-of-class students' self-learning.

In addition, through classroom observations, the author found a teaching cycle that incorporated an in-class lesson with the next lesson by means of the Chunk-Sheet. The teacher conducted reading-aloud activities with the Chunk-Sheet in the lesson, and the students' retention and understanding of the sheet's contents were tested by an in-class quiz in the following lesson. After the quiz, a new Chunk-Sheet was given to students. In this manner, the Chunk-Sheet played an important role in the classroom context and functioned as a medium that bridged an in-class lesson with the next lesson, creating successive teaching cycles. The classroom observations also showed that the presentation activities were conducted several times during the lessons in each trimester to increase students' ability at self-expression in English. In the activities, the teacher recorded students' presentations, intending to use them for possible future reference. The recordings, however, were rarely used as references or resources, despite the teacher in charge urging his students to do so.

Lastly, students' learning efforts in relation to each lesson were usually examined in the midterm and end-of-term tests in each trimester.[2] All tests, including quizzes and the midterm and end-of-term tests, were administered by the teacher. Figure 6.2 illustrates the overall picture of the classroom context.
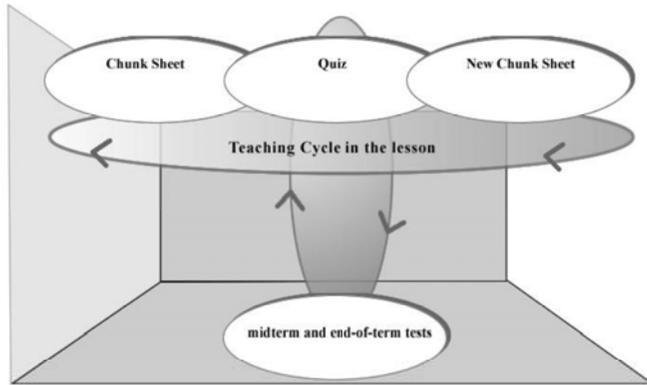
Figure 6.2. A quiz is given after the "Chunk-Sheet" is completed. A new "Chunk-Sheet" is then given to students. The rotation of the "Chunk-Sheet" and the quiz constitutes a teaching cycle in the classroom context.

6.3.2 Technology

CEAS, which was explained in Chapter 4, was again utilized in this study because of its high adaptability and stability. Figure 6.3 shows a student's opening page on *CEAS*. The materials on the LMS were originally prepared by the author in careful collaboration with the teacher. Figure 6.4 is an example of the materials. In addition, movie clips of students' presentations recorded by the teacher were digitalized, and 273 clips were uploaded onto the LMS. Table 6.1 shows the list of the materials that include sample readings of textbooks, songs, chants, past test items, and external links to the websites.

Figure 6.3. The student's opening page on *CEAS*.

Figure 6.4. Supplemental material for the Chunk-Sheet. With this material, students can practice reading aloud while listening to the sound file.

Table 6.1

The List of the Materials Uploaded onto LMS

Type of materials	File type	File format	Number of materials
supplemental materials for Chunk-Sheets	sound and text	*Flash*	41
sample reading for each chapter of the textbook	sound	.mp3	60
external links to websites	text and pictures	.html	27
students' presentations	movie	.mp4	273
songs	sound	.mp3	19
chants	sound	.mp3	9
previous test items	text	.doc	8

Supplemental materials for the Chunk-Sheet (Figure 6.4) were prepared to enable students to prepare for and review the lessons. The students were expected to download the sample reading files onto computers or MP3 players. To increase the opportunity for the students to be exposed to authentic resources, external links to websites were placed on the LMS. The provision of these core learning materials on the LMS was intended to strengthen the teaching cycle in the lesson and elicit students' outside-the-class self-learning, thereby increasing their learning hours. Furthermore, additional learning materials were placed on the LMS. For example, movie clips of the students' presentations were uploaded. The students could share their presentations with friends on the LMS. Also, songs and chants were uploaded for fun activities and previous test items were placed to enable students' preparation for upcoming midterm and end-of-term examinations.

6.4 Data Collection

The data were collected over a nine-month period from April to December 2008. Each lesson lasted for 50 minutes and during the research period, there were a total of 87.5 hours of lessons. The triangulation procedure was again applied to the data collection process (Dörnyei, 2007; Takeuchi, 2003).

To explore the effect of the CML-based teaching practice, a set of data was collected. Midterm and end-of-term test scores were collected as indicators of students' learning achievements and the outcome of their cumulative efforts. Midterm and end-of-term tests were administrated in the first and second trimesters respectively, so that the students took the tests four times during the research period. The intraclass correlation coefficient among the four tests was .98 ($p < .01$, $r^2 = .96$), indicating that the scores of the tests were highly reliable. Quiz scores were also collected as an indicator of both students' understanding of the lessons and the cumulative learning process. The quiz was administrated each time the Chunk-Sheet section was completed, that is, ten times in the first trimester and nine times in the second trimester. The intraclass correlation coefficient among the quizzes was .96 ($p < .01$, $r^2 = .92$), indicating that the scores of the quizzes were also highly reliable. The tests and quizzes were originally developed by the teacher in charge of the class.

The total number of access log entries was also collected. The frequency of the access log entries can be an indicator of how often a student logged onto the LMS and used the materials there for self-learning. Access log entries were automatically counted by the LMS when a student logged onto the system and used the materials. Access log entries counted during the summer vacation were eliminated from the total number in order to investigate how often a student visited the LMS and used the materials after school at home during the trimesters.

In addition, qualitative data, such as interviews with the students and the teacher, classroom observation, and e-mail exchange, were collected to explore the influence of the practice in more detail. As for interviews, a semi-structured interview technique was adopted for this study because it allowed the interviewees (i.e., the teacher and the students) to elaborate on particular issues while introducing new ones (Thornton & Sharples, 2005). The interviews took 30–60 minutes and were recorded with the permission of the teacher and students, and they were later transcribed.

6.5   Data Analysis

To investigate the influence of the teaching practice on the improvement of students' English ability, the correlation coefficients between access log entries and other variables were investigated. Furthermore, the data on 16 students were extracted and the correlation between their z-score gains and the access log entries was examined. These 16 students were selected because they had attained above-average scores on the midterm test in the first trimester and the end-of-term test in the second trimester, so that their English ability seemed to have greatly improved. The correlation coefficient between the two tests was at .95 ($r^2 = 90$, $p < .01$). Z-score gains could be seen as an indicator for determining the level of students' achievement in English improvement. Z-score gains were calculated in two steps as follows: (a) midterm test scores in the first trimester and end-of-term test scores in the second trimester were transformed into z-scores, and (b) the midterm z-scores in the first trimester were subtracted from the end-of-term z-scores in the second trimester.

To investigate the influence of the teaching practice on the students' learning process in more detail, bearing in mind the results obtained through statistics, semi-structured interviews with two students were conducted. The two students were selected because they showed frequent access to the LMS and notable improvement on the end-of-term test score. The first line of questioning involved general questions about the use of the computer at home. The second line of questioning involved more specific questions about the use of the materials on the LMS. The interview sessions were recorded with the teacher's and interviewees' permission and later transcribed by the author.

Lastly, semi-structured interviews with the teacher in charge and observation on his classroom were conducted to investigate the influence of the teaching practice on the teacher's manner of conducting lessons. The interview session consisted of two parts. The first line of questioning involved questions about the teacher's teaching style. The second line of questioning involved questions about how the practice influenced the lessons. Additional interview sessions were conducted after classroom observations. The data obtained were all transcribed by the author with the permission of the teacher.

6.6   Results

6.6.1   Students' English Ability

To investigate the influence of the teaching practice on the improvement of students' English ability, the correlation coefficients between access log entries and other variables were examined. The following variables were entered in the analysis: (a) midterm test scores in the first trimester (test 1); (b) end-of-term test scores in the first trimester (test 2); (c) midterm test scores in the second trimester (test 3); (d) end-of-term test scores in the second trimester (test 4); (e) quiz scores just before test 1 was conducted (quiz 1); (f) quiz scores just before test 2 was conducted (quiz

2); (g) quiz scores just before test 3 was conducted (quiz 3); (h) quiz scores just before test 4 was conducted (quiz 4); and (i) access log entries (log). The variables were analyzed by using non-parametric statistical analysis (Siegel, 1956) since the normality of the data was not guaranteed in the quiz scores. Table 6.2 gives the results of Spearman's rank-order correlation of all the variables.

Table 6.2

Intercorrelation among the Variables

	a	b	c	d	e	f	g	h	i
a: test 1	—								
b: test 2	.95**	—							
c: test 3	.90**	.93**	—						
d: test 4	.90**	.93**	.95**	—					
e: quiz 1	.51**	.48**	.51**	.49**	—				
f: quiz 2	.60**	.61**	.63**	.64**	.50**	—			
g: quiz 3	.58**	.58**	.61**	.61**	.52**	.64**	—		
h: quiz 4	.70**	.72**	.72**	.76**	.59**	.64**	.59**	—	
i: log	.32**	.38**	.47**	.39**	.24*	.30**	.29**	.39**	—

Note. $N = 93$; *$p < .05$, **$p < .01$ Data sets of test 1 and quiz 1, test 2 and quiz 2, test 3 and quiz 3, and test 4 and quiz 4 are underlined.

Strong levels of correlation were found between test and quiz scores, and the degree of coefficient correlation gradually increased as the number of tests accumulated: test 1 and quiz 1 (item "a" and "e," $r = .51$); test 2 and quiz 2 (item "b" and "f," $r = .61$); test 3 and quiz 3 (item "c" and "g," $r = .61$); and test 4 and quiz 4 (item "d and "h," $r = .76$). The correlation among the test scores is higher than that for the quiz scores. This might well represent the Japanese EFL context, in which term test scores have a great influence on the evaluation of the final grade in each trimester. The students, thus, usually study harder for the tests than for the quizzes. In addition, moderate levels of correlation were found between the access log entries and other variables.

Figure 6.5 illustrates the distribution of the students' midterm test scores in the first trimester ($M = 53.57$, $SD = 21.66$) and end-of-term test scores in the second trimester ($M = 48.46$, $SD = 19.70$). Sixteen students were selected because they had attained above-average scores on both the midterm test in the first trimester and the end-of-term test in the second trimester. For the scores of the 16 students on the midterm test in the first trimester, the mean was 71.13 and the standard deviation was 10.10, whereas on the end-of-term test in the second trimester, the mean was 71.00 and the standard deviation was 8.97. Their z-score gains were then calculated ($M = 0.33$, $SD = 0.19$). An analysis of the correlation coefficient between the z-score gains and the 16 students' access log entries ($M = 9.69$, $SD = 10.49$) showed a moderate level of correlation ($r = .46$, $r^2 = .21$), thereby showing that the number of times that the students used the LMS for learning might have had an influence on the improvement of students' achievement in English ability.

6.6.2 Interviews with Two Students

To investigate the influence of the practice on the students' learning process in more detail, semi-structured interviews were conducted with Students A and B (see Figure 6.5). They both registered high access log entries and high z-score gains. The interviews were conducted in Japanese, so that they could express themselves naturally in their mother tongue. The transcriptions were translated into English by the author.

Student A is a female student. She stood 45th in the midterm test z-scores in the first trimester but rose to 2nd place in the end-of-term test z-scores in the second trimester. She logged onto the Web 20 times during the research period. Student B is a male student. He ranked 46th in the midterm test z-scores in the first trimester but moved to 22nd place in the end-of-term test z-scores in the second trimester. He logged onto the web page 26 times during the research period.
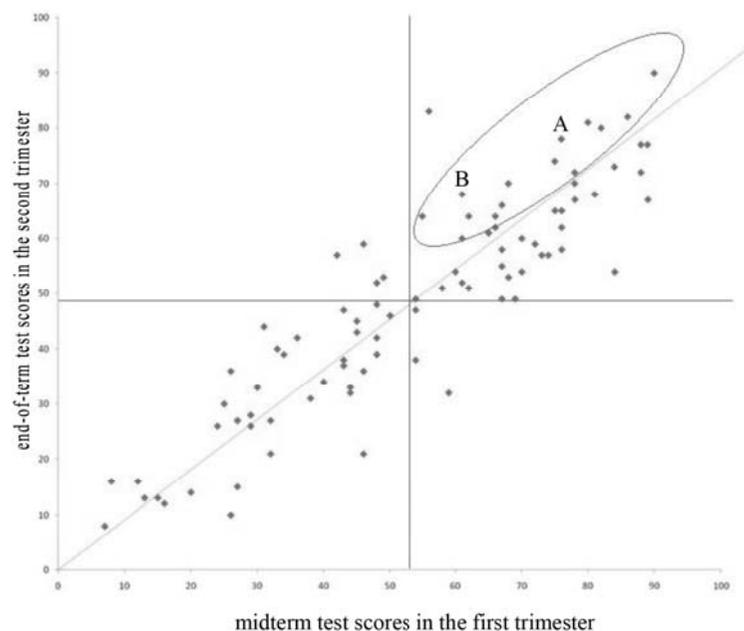

Figure 6.5. Scatter diagram illustrates the distribution of learners' midterm test scores in the first trimester and end-of-term test scores in the second trimester. The data set of the 16 students is circled. A and B show the scores of the students interviewed.

Through the interview sessions, it became clear that the LMS offered students an additional learning environment and they used the resources on the LMS

effectively. However, they differed from one another in the way they used the materials on the Web. Student A did not use the computer at home on a regular basis, and she logged onto the LMS when she felt she needed to do so.

Interviewer:	*How often do you use the materials on the LMS at home?*
Student A:	*Sometimes, when I need to check them.*
Interviewer:	*Do you often use the computer?*
Student A:	*No.*
Interviewer	*How do you use the materials on the LMS when you need to do so?*
Student A:	*To write my comments or diary on the bulletin board system, and listen to the sound files.*

(Translation mine)

In contrast, Student B used the computer almost every day.

Interviewer:	*How often do you use the materials on the LMS at home?*
Student B:	*Quite often.*
Interviewer:	*Do you often use the computer?*
Student B:	*Yeah.*
Interviewer:	*How do you use the computer?*
Student B:	*I like music, so I use it for editing, listening, and buying music. I often look at YouTube and listen to iTunes.*
Interviewer:	*Do you send e-mail on the computer?*
Student B:	*Yeah. Almost every day.*
Interviewer:	*How do you use the materials on the LMS?*

Student B: *I download the sound files and put them onto my iPod. I also use the materials for my self-study.*

Interviewer: *Did you notice any changes since you started downloading the sound files?*

Student B: *Yeah, I think I started practicing pronunciation with them.*

(Translation mine)

Even though the number of access log entries did not differ much between Students A and B, the way they used the materials on the LMS was completely different. Student A's focus was mainly on in-class coursework and she treated studying with the LMS materials as extra work. In contrast, Student B used the computer quite often and utilized the materials in his own way. This finding is in accordance with K. H. Wang, T. H. Wang, Wang, and Huang (2006), in which they revealed that learning style was a significant factor affecting students' achievement in a Web-based learning environment. In addition, both students mentioned that they liked watching friends' presentations, which were recorded during the lessons and put on the LMS by the teacher as a reference for their upcoming presentations.

With these results in mind, it is possible to maintain that the students' use of the materials on the LMS was moderately related to their cumulative efforts toward their quiz scores and the improvement in their English ability. In addition, the resources on the LMS offered students an additional learning environment and students used the resources on it outside the classroom. Although a definite causal relationship between the use of the materials on the LMS and the improvement of students' English ability has yet to be clearly identified, it is thus possible to argue

that the practice based on the CML successfully integrated in-class practices with students' outside-the-class self-learning by means of technology.

6.6.3   Interviews with the Teacher

The second research question of Study 3 was investigated by means of a semi-structured interview with the teacher. The teacher answered the question of how the CML-based teaching practice had influenced the way he conducted lessons. The interviews were conducted in Japanese and later transcribed with the teacher's permission. The transcriptions were translated into English by the author.

The following excerpt from the interview shows that the teacher's way of conducting lessons qualitatively changed due to the creation of a seamless linkage between the lesson and students' self-learning at home. With the help of the CML-based teaching practice, the teacher was able to offer an "extended learning environment" (van Deusen-Scholl et al., p. 657) via the LMS, and to expand the classroom context, time, and space for teaching/learning. As a result, the teacher has reduced the time for one-way instruction, and spent sufficient time on reading activities and interaction with the students during lessons. In addition, and more importantly, these qualitative changes in the lessons seem to have created an environment that leads the students to autonomous learning. The comment by the teacher in the interviews, such as, "*I can let the students study on their own or I can let them teach themselves,*" seems to reflect the improvement in the quality of the lessons.

Interviewer: *Do you think that your way of conducting lessons has changed since you started the new teaching practice?*

Teacher: *Yes, I think so. Today's lesson can be a good example (In the lesson, the students sang a song in English). I used to try to finish one thing in one lesson, even if time was very tight. However, it won't happen now. As you (the interviewer) saw today, I did not give them the lyrics of the song first, because I had told them that "you can check them (the lyrics and the song) on the LMS" and "you can watch the movie clip linked to YouTube." In this sense, I can let the students study on their own or I can let them teach themselves.*

Interviewer: *Aren't you worried about handling lessons in that way?*

Teacher: *No. At least I've given students the learning materials, the "Chunk-Sheets," so that they can do the minimum requirements such as checking the Japanese meaning, the vocabulary, and the pronunciation by themselves with the resources on the LMS. As a result, now I have reduced the time spent on simple explanations and spend more time on activities during lessons. That's a big difference.*

(Translation mine)

To confirm the teacher's comments in the interview, video data were collected and analyzed. Table 6.3 shows the result of video data categorization. Video data were collected during an ordinary lesson in the research period. One lesson was 50 minutes, but the amount of time that was used for checking students' attendance was omitted from the data. A part of the Grounded Theory Approach procedure (Corbin & Strauss, 2008, Chapters eight and nine) was used in the classification of the video data. As a result, five categories were generated. "One-way Instruction" was used to categorize the period of time in which the teacher elaborated on the reading materials or related issues in the textbook on one-way instruction. "Interactive Instruction" was used to categorize the period of time in which the teacher asked questions and the students answered his questions, or the students asked questions and he answered them. "Students in Individual Activities" was used to categorize the period of time in which the students were engaged in an individual activity such as reading-aloud activity. "Students in Group Activities" was used to categorize the period of time in which the students were engaged in group activities such as sharing notebooks and checking pronunciation. Lastly, "Students' Presentation" was used to categorize the period of time in which the students gave presentations. The inter-rater reliability (of all the data analyzed) was at 82.5%. The author decided that the result was at an acceptable level of agreement (Potter, 1996).

Table 6.3

Categorization of Video Data Analyzed

	Time [h:mm:ss]	Percent
One-way Instruction	0:14:44	34.6%
Interactive Instruction	0:03:34	8.4%
Students in Individual Activities	0:06:41	15.7%
Students in Group Activities	0:15:48	37.1%
Students' Presentation	0:01:51	4.3%

Note. h = hour. m = minute. s = second.

As the result shows, the way in which the teacher conducted the lesson seemed to be fully interactive and cooperative. The amount of time for "Interactive Instruction," "Students in Individual Activities," and "Students in Group Activities" together amounted to 61.1% of the total lesson time. Reflecting on the previous lessons in which he was teaching without the use of LMS, the teacher answered in the interview as follows:

Interviewer: *Before you started using the new teaching practice, in what way did you conduct lessons?*

Teacher: *I think I was giving lessons in a very orthodox style. It was kind of grammar translation method, copying the target sentences from the textbook, reading them out and asking the students the Japanese meanings.*

Interviewer: *You mean it was based on the textbook.*

Teacher: *You can say that. But if you have lessons in that way, as is obvious, you can't give the students time and opportunities to practice and use English in lessons. I believe it is important to learn English through practicing. I want the students to speak and use English in lessons. I have tried many things so far to reduce the amount of time spent on one-way instruction, but it was really hard to do so in the lessons. However, since I started the new teaching practice based on the CML, the amount of time I can spend for practicing has notably increased. I am not sure if the way the students use English is real English or not, but at least, I have an enormous amount of time in lessons, in which I can let them teach themselves.*

(Translation mine)

In the interview, the teacher said his way of conducting lessons has changed from the orthodox grammar translation method to more interactive and student-centered ways. With the help of the CML-based teaching practice, the teacher could expand the classroom context.

6.7   Discussion

The results suggest that the teaching practice based on the CML in this study had a positive influence on students' learning environment and the manner in which the teacher conducted the lesson. Furthermore, the practice contributed to the improvement of students' achievement in English ability.

With these results, the wider range of applicability of the CML-based teaching practice in the Japanese EFL context is confirmed. The author insists that this teaching practice can contribute to ameliorating the disadvantage of learning English in the Japanese EFL context. It is true that the improvement of students' English ability and the teacher's way of conducting lessons are not entirely attributable to the use of technology, but we can at least say that the CML instructional design based on the ecological perspective, which places technology within the totality of the classroom context, makes it possible to fully integrate technology into teaching practices.

The teaching practice also brought about other positive results in the school. Other teachers at the school in different school years showed interest and spontaneously started using the LMS as a part of their English lessons as well. This phenomenon was a somewhat unexpected positive influence and indicated how the CML-based teaching practice was successfully integrated into the school environment.

At the same time, however, through this study, some of the difficulties in implementing the teaching practice at public lower secondary schools in the Japanese context became clear. Firstly, it is difficult to guarantee the full availability of computers to all students. Secondly, differences in students' learning style have significant effects on the use of technology for learning. Furthermore, teachers at public lower secondary schools in Japan are usually extremely busy with administrative work other than teaching, so that human support is indispensable to the successful implementation of the teaching practice. For future practice, these issues should be taken into account.

6.8   Summary of Study 3

The results of Study 3 indicated the CML-based teaching practice with its ecological perspective has a wider range of applicability in the Japanese EFL context. The teaching practice successfully integrated in-class practices with students' outside-the-class self-learning via the use of technology. In addition, the practice positively influenced the improvement of the students' English ability and the teacher's way of conducting lessons. With the help of the CML-based teaching practice, the teacher was able to offer an extended learning environment via the Web to the students, and to expand the classroom context, time, and space for language learning.

Notes

1. The process of carefully exploring the context in which people interact with tools is indispensable from an ecological perspective (Suri & IDEO, 2005). Timuçin (2006) mentioned that "it is vital to create opportunities to make the teachers use what they have been doing and take advantage of what they are familiar with (for example, assigning them to prepare support materials, given the chance to evaluate feedback forms, etc.), instead of asking them to forget everything they have been doing for so long and adopt a completely novel way of teaching instantly" (p. 269).

2. The first trimester was from April 6 to July 18, and the second trimester was from September 1 to December 22, 2008.

7. Conclusion

Before concluding this dissertation, some limitations should be addressed.

First, the ecological perspective was discussed in this dissertation only from the teachers' perspective. To discuss the ecological perspective in its full sense, viewpoints from learners, school administrators, and software/hardware developers should be included. Second, the teaching practices based on the CML were tested only with the LMS. To investigate a wider range of applicability, the teaching practice should be designed and implemented with other types of technology, such as handheld devices. In this connection, the practice was tested only on two environments. Therefore, additional tests should be conducted in different situations representing the Japanese EFL context.

Despite these limitations, an ecological perspective on the use of technology in foreign language teaching was successfully proposed in this dissertation. In addition, with a view to promoting the integration and normalisation of technology in language teaching, a teaching practice based on the CML was designed and implemented in real teaching contexts over an extended period. It had a positive influence on the improvement of students' English ability and the manner in which the instructors conducted the lesson.

The author would now like to summarize the major findings according to the research questions outlined in the first chapter.

1. *What are the factors that impede the use of technology by teachers in the Japanese EFL context?*

As Study 1 shows (Chapter 3), three factors that seemed to be impeding integration and normalisation were found: (a) Technology factor, (b) Environment factor, and (c) Institution factor. In addition, interviews and classroom observations revealed the dilemma that is shared by many EFL instructors in the Japanese context: LL and CALL classrooms were developed to facilitate language teaching, for which educational institutions provided a large amount of funding. However, in most cases, the technology installed for language teaching has not been used as was intended, and worse, facilities have been considered to be obstacles to teaching. Inconsistency of interface design and labeling, and cramped classrooms are also found to impede the use of technology by teachers within the classroom context. Furthermore, without technical support and faculty development, teachers have few opportunities to improve their way of using technology. As a result, their frustration and disaffection with technology have mounted, and they have gradually stopped using LL and CALL facilities.

2. *Which teaching model (based on a theoretical perspective) is feasible for attaining integration and normalisation of technology use in foreign language teaching in the Japanese EFL context?*

On the basis of the findings in Study 1 (Chapter 3), the author insisted that an instrumental perspective (Warschauer, 1998) can impede the integration and normalisation of technology use in foreign language teaching, since it views technology as an isolated tool and deals with technology without considering *what* and *how* teachers teach in classrooms. Instead of an instrumental perspective, to achieve the concepts of integration and normalisation, the author proposed an ecological perspective, which deals with technology within the totality of the context in which actual language teaching and learning occur. The ecological perspective was summarized by the following formula:

$$U = f(PCT)$$

By viewing the use of technology in foreign language teaching in light of this formula, the author believes that technology can obtain a "field of meanings" (Wenger, 1990) and can be integrated into the classroom context. As a result, a stage of integration and normalisation can be achieved.

The author then adopted the "cyclic model of learning" (Takeuchi, 2007b) as the basis for formulating a new teaching practice. The CML, which is devised from the ecological perspective, considers that the process of foreign language teaching is a combination of the teaching flow within a lesson and the teaching flow between lessons (the latter of which is formed via technology), and that these two teaching flows create the classroom context. In addition, the CML attempts to integrate in-class lessons with outside-the-class students' self-learning by connecting preparation, lesson, and reflection to one another with the aid of technology.

3. *Does the teaching practice based on the model really have the expected effects?*

The results of Studies 2 and 3 show that the CML-based teaching practice had a positive influence on the improvement of students' English ability and the manner in which the instructors conducted the lesson. The positive effect of the teaching practice was thus confirmed. Study 2 (Chapter 5) indicates that the teaching practice largely facilitates students' learning in the group of students with lower English proficiency and that the number of times the students used the resources on the LMS might have had an influence on students' achievement. In addition, the practice

provided teachers and learners with extra time and opportunities to teach and to learn English. As a result, a positive learning environment emerged. It also helped to create a supportive relationship among the students and to facilitate their learning. In Study 3 (Chapter 6), the CML based teaching practice was applied to a Japanese public lower secondary school. With some adjustments to the practice, it was implemented over an extended period. The results confirmed the wider range of applicability of the practice. The study also showed that the number of times that learning occurred on the LMS influenced students' achievement and that the materials on the LMS provided the students with an auxiliary learning environment and scaffolding. However, the way that individual students used the materials differed according to their learning styles. Also, the CML-based teaching practice qualitatively changed the teacher's way of conducting lessons, owing to the creation of a seamless linkage between the lesson and students' self-learning at home.

Now, the pedagogical implications of this dissertation are presented. First, collaboration between practitioners and researchers is needed to promote the use of technology in foreign language teaching. In particular, in public lower secondary education, teachers are so busy that they do not have opportunities to learn the latest technology for foreign language teaching. With the help of researchers, therefore, they can explore new possibilities for teaching a foreign language by means of technology.

Second, human resources who are well versed with the use of technology in language teaching should be developed. In the Japanese educational context, those who want to be language teachers have few opportunities in their training to study the use of technology. However, along with the innovation and diffusion of ICT, it has become impossible for them to ignore the use of technology in teaching. To

improve this situation, therefore, offering courses related to the use of technology is indispensable in language teacher training programs.

Lastly, the author would like to conclude this dissertation with two suggestions for future CALL research: First, a perspective that integrates technology into teaching practices is needed to advance CALL research. In the process of researching such a perspective, the *integration* and *normalisation* of the use of technology in foreign language teaching become significant concepts. Second, to make practical application of these concepts, the author firmly believes that CALL research needs to broaden its field from the *inside-the-classroom* to the *outside-the-classroom*. For achieving the integration and normalisation and broadening its field, an ecological perspective, which explores the use of technology within the totality of the context in which actual language teaching and learning occur, will be a key in CALL research.

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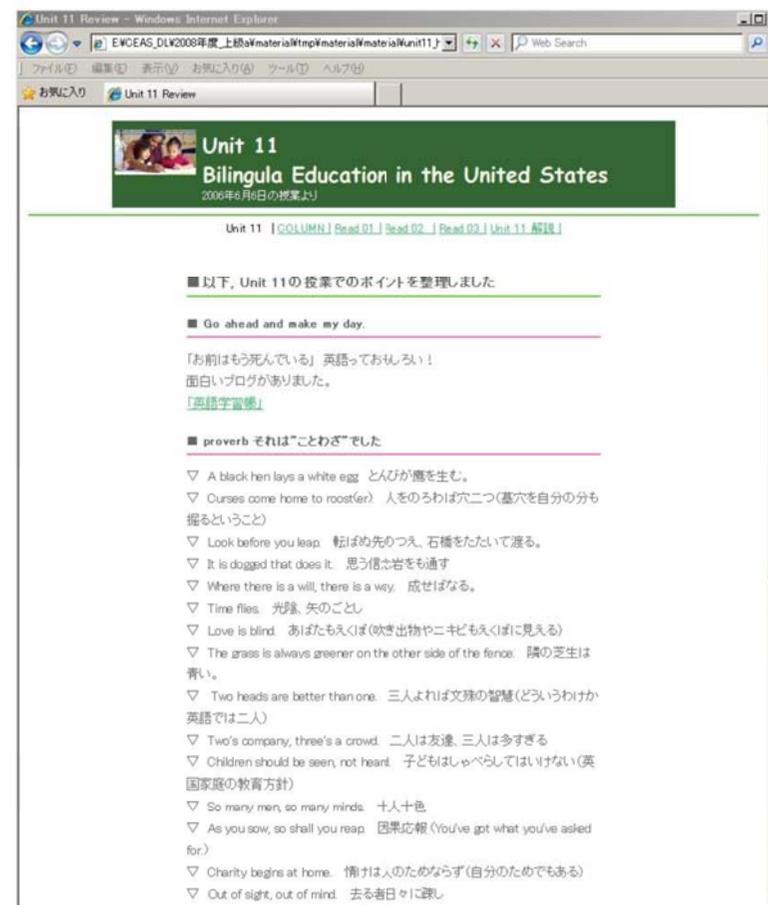
Appendix A. Examples of the Materials Provided on the LMS

(Digitalized with the permission of the publisher)
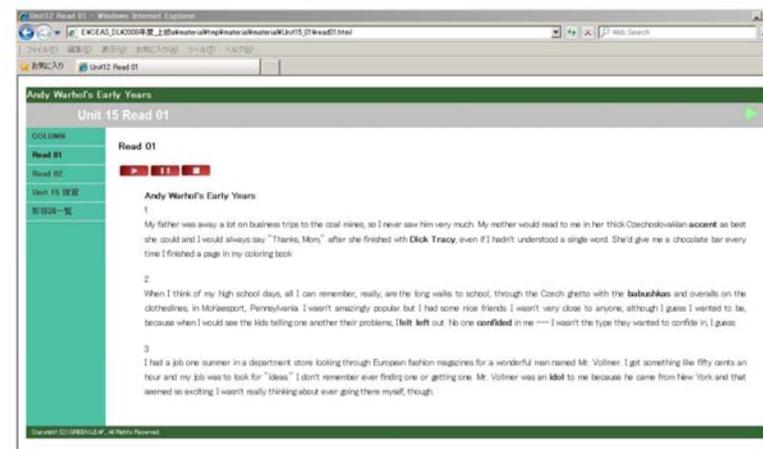
Appendix B. Examples of the Supplemental Materials Provided on the LMS
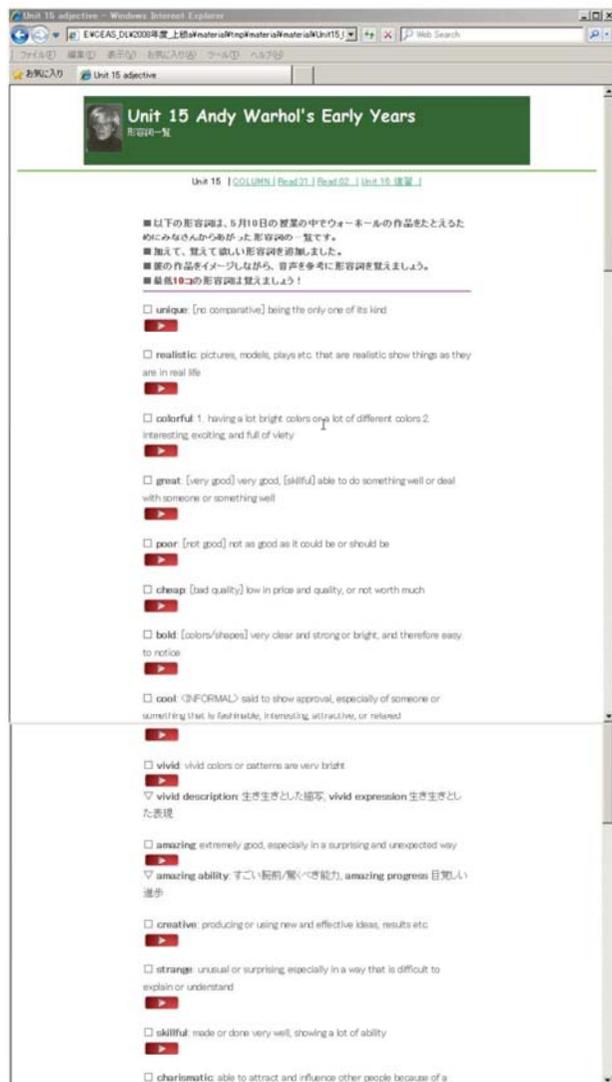
(Continued)

Appendix C. An Original Version of Questionnaire for Students'
Perception of the Teaching Practice Used in Study 2 (Chapter 5)

以下の質問をよく読み，当てはまる番号を選びなさい。

【授業について】

1. この授業を通して，英語力が向上したと思いますか。

2. この授業を通して，英語の語彙が増えたと思いますか。

3. この授業を通して，日常的に英語を勉強するようになったと思いますか。

4. この授業を通して，これからも英語の勉強を続けて行こうという気になりましたか。

5. この授業を通して，英語への興味関心は深まったと思いますか。

6. この授業を通して，英語を聞くことに慣れたと思いますか。

7. この授業を通して，英語を読むことに慣れたと思いますか。

8. この授業を通して，リスニング力が向上したと思いますか。

9. この授業を通して，リーディング力は向上したと思いますか。

10 この授業を通して，英文を読むスピードが早くなったと思いますか。

11. この授業を通して，英文を正確に読めるようになったと思いますか。

12. この授業を通して，英文読解に必要な方略を知ることができたと思いますか。

13. この授業を通して，英文に触れる機会が増えたと思いますか。

14. この授業を通して学んだ読解方略は，教科書以外の英文を読む時にも役に立つと思いますか。

15. この授業の内容は，自分の英語力にあっていたと思いますか。

16. この授業では，一人ひとりへの配慮が行き届いていたと思いますか。

17. この授業では，一人ひとりに発言の機会があったと思いますか。

18. この授業では，一人ひとりに質問をする機会があったと思いますか。

19. この授業では，十分に授業後のサポートがされていたと思いますか。

20. この授業では，授業中，クラスメートと一緒に考える時間が十分にあったと思いますか。

21. この授業では，先生は工夫をして授業を進めていたと思いますか。

22. 教科書の内容と関連して，先生の小話や余談があったのはよかったと思いますか。

23. この授業を通して，教科書の内容以外にもさまざまな役に立つ知識が身に付いたと思いますか。

24. 授業の最初に，前回の授業内容を確認する Quiz があったのはよかったと思いますか。

25. ポイント制による平常点の加算システムがあったのはよかったと思いますか。

26. 授業にグループワーク（グループで学習すること）が取り入れられていたのはよかったと思いますか。

【自己評価】

27. 積極的に授業に参加できたと思いますか。

28. この授業は充実していたと思いますか。

29. 前期を通して，１つのことをやり遂げたという達成感がありますか。

30. この授業の予習・復習は大変だったと思いますか。

31. この授業には予習・復習をして参加したと思いますか。

32. この授業で身に付けた知識は自分のためになると思いますか。

33. 積極的に授業では発言したと思いますか。

【担当者について】

34. 先生は，学生の質問に気軽に応じてくれたと思いますか。

35. 先生は，学生の質問にしっかりと答えてくれたと思いますか。

36. 先生は，学生に気軽に話しかけてくれたと思いますか。

37. 先生は，分からない部分を理解させようとサポートしてくれていたと思いますか。

38. 先生は，学生がすぐには回答できない時，十分に考える時間を与えてくれたと思いますか。

39. 授業を通して，先生に親近感を感じることができたと思いますか。

【友人について】

40. この授業は，クラスメート同士の仲がいいと思いますか。

41. この授業は，よい雰囲気で授業が進められたと思いますか。

42. この授業では，クラスメート同士のチームワークがあったと思いますか。

43. 授業中，クラスメート同士で教え合うことがあったと思いますか。

44. 授業中，クラスメート同士で助け合うことがあったと思いますか。

45. 授業中，クラスメートの発言に新しい発見や教科書の内容理解を深めるヒントがあったと思いますか。

46. 授業を通して，クラスメートに親近感を感じることができたと思いますか。

【TA について】

47. この授業には，先生以外に TA がいたのでよかったと思いますか。

48. この授業には，先生以外に TA がいたので授業の理解度が深まったと思いますか。

49. この授業には，TA がいたので安心して授業に参加することができたと思いますか。

50. この授業には，TA がいたので，安心して *CEAS* を使うことができたと思いますか。

51. この授業では，TA に気軽に質問をすることができたと思いますか。

52. 授業を通して，TA に親近感を感じることができたと思いますか。

【LMS について】

53. *CEAS* は使いやすかったと思いますか。

54. *CEAS* に公開された教材は使いやすかったと思いますか。

55. 授業の予習・復習教材が *CEAS* に公開されたのは良かったと思いますか。

56. *CEAS* の復習教材には，授業内容が適切に反映されていたと思いますか。

57. *CEAS* に公開された教材は，英語力向上にも役に立ったと思いますか。

58. *CEAS* の復習教材をよく利用したと思いますか。

59. *CEAS* の復習教材は Quiz（小テスト）の勉強に役に立ったと思いますか。

60. *CEAS* に予習・復習教材があることによって，授業への参加意欲が高まったと思いますか。

61. *CEAS* を通して，教材以外の関連サイトもよく閲覧したと思いますか。

62. *CEAS* に公開されている情報や関連サイトを通して，教科書の内容理解を深めることができたと思いますか。

63. *CEAS* の 3 択テストを受けるために英文を読み，教科書の内容理解をさらに深めることができたと思いますか。

64. *CEAS* の3択テストを通して，読解力を高められたと思いますか。

65. *CEAS* の3択テストを通して，英語の語彙が増えたと思いますか。

66. *CEAS* の復習教材の音声は便利だと思いますか。

67. *CEAS* の復習教材の音声をよく利用したと思いますか。

68. これからも *CEAS* を利用して，パソコンで学習できる教材があればいいと思いますか。

69. 教室での授業と *CEAS* の両方を利用した授業スタイルは，効果的だと思いますか。

70. *CEAS* で教科書の解説を全て行い，教材を提供すれば，通常の授業のような対面式（教室での）授業はいらないと思いますか。

71. もし機会があれば，この授業のように，通常の授業（対面式授業）と *CEAS* の教材が連携した授業を，もう一度受けてみたいと思いますか。

72. *CEAS* に予習・復習教材があることによって，自己学習がやりやすくなったと思いますか。

73. *CEAS* に予習・復習教材があることによって，授業時間以外の自己学習の時間が増えたと思いますか。

74. この授業を通して，パソコンを利用する機会が増えたと思いますか。

75. この授業を通して，インターネット上の英文に触れる機会が増えたと思いますか。

76. この授業を通して，意識的にインターネットを使って情報を集めたりするようになったと思いますか。

77. パソコンやインターネットは英語学習に役に立つと思いますか。

Appendix D. Samples of the Chunk Sheet Used in Study 3

2年：Homestay in the United States（Unit 4—S／D・・・P40・41）59語

1			Communication is important.
2			You have to speak English.
3			But you don't have to speak perfect English.
4			You're a member of the family.
5			You have to help with the homework.
6			(Mrs.Baker) Shin, did you make your bed?
7			(Shin) Make my bed?
8			(B) Yes.
9			We all have to make our own beds.
10			(S) OK.
11			But I don't know how.
12			(B) Really?
13			All right.
14			I'll show you.

2年：Homestay in the United States（Unit 4—S／D・・・P40・41）59語

1			コミュニケーションが大切です。
2			あなたは英語を話さなければなりません。
3			しかし、完全な英語を話す必要はありません
4			あなたは家族の一員です
5			あなたは家事を手伝わなくてはなりません
6			(Mrs.Baker) シン、ベッドメークはしましたか？
7			(Shin) ベッドメークですか？
8			(B) そう
9			みんな各自のベッドをきちんとしければなりません
10			(S) わかりました
11			でもやり方がわかりません
12			(B) そうなの
13			いいわ
14			教えてあげますよ

2年：Homestay in the United States（Unit 4—R②・・・P43）42語

1			(Carlo) I'm sad.
2			My host family is so busy.
3			They don't take me
4			anywhere.
5			Nana's host family always takes her
6			to interesting places.
7			(Teacher's Answer) Carlo, you mustn't compare host families.
8			You can find interesting things
9			around your home.
10			Look around
11			and make some friends.

2年：Homestay in the United States（Unit 4—R②・・・P43）42語

1			ぼくは悲しいです
2			ぼくのホストファミリーは、とても忙しい
3			連れて行ってくれません
4			どこにも
5			ナナのホストファミリーは、いつも連れて行ってくれます
6			おもしろいところに
7			(Teacher's Answer) カルロ、ホストファミリーを比較してはいけません
8			おもしろいことはみつけられますよ
9			あなたの家のまわりで
10			あたりを見なさい
11			そして友達を作りなさい