Kanji Learning Courseware

By

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10699

Dissertation submitted in partial fulfilment of

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Bachelor of Technology (Hons)

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CERTIFICATION OF APPROVAL

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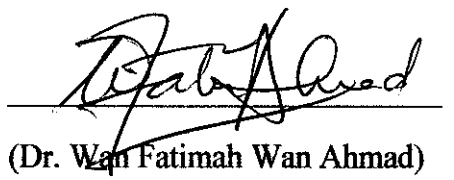
Approved by,



(Dr. Wan Fatimah Wan Ahmad)

UNIVERSITI TEKNOLOGI PETRONAS

TRONOH, PERAK

January 2011

CERTIFICATION OF ORIGINALITY

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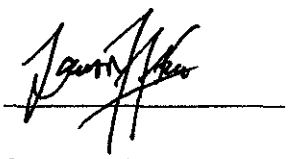

LOKMAN HAKIM BIN SUHAIMI

ABSTRACT

With the emergence of the Globalization Era, foreign languages studies have become increasingly popular among the people. However, there's a huge barrier in learning Japanese due to the language being both unique and alien to outsiders especially the Kanji script. The Kanji characters consists of over 2000++ characters which in turn might scare them and possibly break their motivation to continue learning. Not to mention the hardship that students have to endure by learning the characters the traditional way. With the 'Kanji Learning Courseware' which uses the Leitner flashcard system and Heisig's "Remembering the Kanji" techniques (to name a few), it may help people particularly students in their Kanji characters' learning. Currently available courseware will be analyzed to gather vital information about the current available features. New features which didn't exist in the current software such as animations to help in writing the characters, pronunciation guide with sound, and many more will be incorporated. It is hoped that the courseware will meet its objectives and probably serve as a catalyst into something even bigger and better in the future.

ACKNOWLEDGEMENT

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ABBREVIATIONS AND NOMENCLATURES

FYP – Final Year Project

GUI - Graphical User Interface

CHAPTER 1

INTRODUCTION

Kanji characters are Chinese characters which are widely used in Japan. It were imported from China since 54AD (according to some of the scholars). This is because Japanese at that time didn't have its own writing system. In the beginning, original texts were in Chinese language and would be read as it is. However, a system that's called 漢文(Kanbun - classical Chinese literature) emerged. This allowed Japanese speakers to restructure the Chinese text to follow the rules of Japanese grammar. In modern Japanese, Kanji characters are used for parts of the language such as nouns, adjective stems and verb stems. The rest were in 2 other scripts (hiragana and katakana).

Though came from the same root, Japanese "Kanji" have became significantly different from its counterpart, Chinese "Hanzi" that are used in China. This was due to a couple of reasons, namely newly created characters in Japan, simplifications made to the characters (not all), and characters that were given different readings and meanings from the original ones.

Characters that were made by the Japanese are known as 国字 (Kokuji - national characters). For instance:

峠 = mountain pass 働く = work 畑 = field of crops

On the other hand, characters that were given different meaning are known as 国訓 (Kokkun = National reading). For instance:

沖 = offshore as opposed to Chinese "minor river"

Apart from that, there were 2 types of readings, the 訓読み (Kun'yomi = Japanese readings) and the 音読み (On'yomi = Chinese readings). Basically, most of the characters would have both readings. Some of the characters even have multiple On'yomi and Kun'yomi readings. This was a result of the way Kanji characters were brought in. As we know, the Chinese have various dialects where each dialects have different pronunciation for each characters. When brought into Japan by Chinese traders or Japanese scholars studying in mainland China, it is possible that multiple readings became associated with the characters. As for the Kun'yomi, it is basically Japanese readings which directly associated to the meanings. The Japanese associated the characters with its rightful meanings in Japanese language.

Common misconception about the characters is that the way it were built were completely random. This resulted in over 1000++ Kanji characters are treated as different from each other. In the contrary, Kanji characters should be treated as "building blocks" since some of the more complex Kanji characters are simply derived from a couple of simple Kanji characters. This will be further explained in the Literature Review section later on. With this in mind, learning Kanji characters will become much easier. With this in mind, comes the idea to develop a courseware that can help students to learn the Kanji characters more easily.

1.1 Background of Study

The project is about researching and creating a courseware that may assist the users to learn Kanji (Chinese characters that are used in Japan). Among the theories that will be utilized in the development of this courseware are the ideas and methods used by James Heisig in his work "Remembering the

Kanji" as well as the Leitner System that utilizes flashcards to help people remember what they have learnt. Current courseware (kanji-koohii.com and ANKI for example) that's already available to the masses are good, however there are still rooms for improvements. This is where the 'Kanji Learning Courseware' comes in. It will put into considerations all the good ideas from its predecessors as well as new ideas that might come along the research period.

1.2 Problem Statements

1) It's difficult to remember the Kanji characters since there are so many of them (2000++)
2) There were only few software that cater for the study of Kanji characters, and only one uses Heisig's method – 'Remembering The Kanji' and Leitner's Flashcard system.

1.3 Objectives

1) To study and research on the suitable approach to learn the Kanji characters to make it less difficult and more manageable.
2) To develop a working courseware that implemented the results acquired from doing the research at the previous stage.
3) To test the usability and compatibility of the established theories (Leitner's Flashcard System and Heisig's Mnemonics) with each other as well as with the new/improved features in helping the users to achieve their ultimate goal – to know Kanji characters by heart.

1.4 Scope of Study

1) User Interface (UI) design that conforms to the HCI standards
   a. Users shall be presented with a simple yet meaningful UI to enhance their experiences when using the software.
   b. Storyboards will be created to help in building the UI.

2) Research on various subjects with regards to the software from the methodology used to the main functions.

a. Ample research is vital to ensure the success of the software.

b. A lot of useful information could be easily accessed from the Internet as well as reference books.

3) Find out the possibility to tweak the flashcard system and 'Remembering the Kanji' to enhance it.

a. Not to say that those methods mentioned above did not quite suitable to the software but still there are rooms for improvements.

b. Those methods were 20++ years old (RTK and Leitner System was created in the 1970s), so it is definitely possible to expand the ideas to better suit our generations.

c. Negative feedbacks exist for both theories; therefore those feedbacks will be analyzed to find ways to improve them.

4) Test out the courseware for any defects or to ensure that it functions as intended.

CHAPTER 2

LITERATURE REVIEW

2.1 Traditional learning system

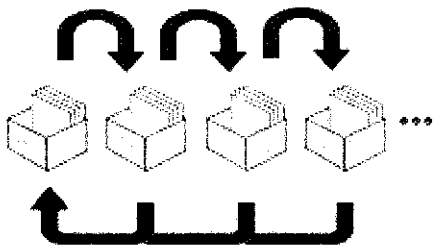
In the early period of learning Kanji characters, many of the resources available were emulating the way Kanji characters are taught to the natives. This means to learn Kanji characters from easy to hard in terms of meanings. However this method doesn't really work when used to teach foreigners who didn't have basic in the characters (unlike the Chinese people) since it wouldn't make much sense to them. Some of the more complex Kanji characters are taught at an early stage due to its meaning (e.g  = cold). Plus, the meaning and readings are taught along with the characters which increases the steepness of the learning curve.

2.2 Leitner system

An excerpt from an article explaining about the Leitner's Spaced Repetition System

"In the early 70's a German psychologist named Sebastian Leitner devised a learning system that makes selective learning possible with less effort than the traditional method of studying a set of flashcards sequentially.

Leitner's system consists of flashcards divided into a number of compartments. The compartments are filled with flashcards and the flashcards are moved from one compartment to another, according to the current level of knowledge. When a flashcard is answered correctly it is promoted to the next compartment. When a flashcard is answered incorrectly it is demoted to the first compartment."



How It Works

- When studying the flashcards in a given compartment you examine the flashcards sequentially and indicate success or failure.
- All flashcards that were answered correctly are promoted to the next compartment. Flashcards that were not answered correctly are demoted to the *first* compartment.
- Those flashcards will be tested again and again on a set period of time to promote long-term memory. The length of each period depends on the compartment the cards are in. As the number of the compartment increases, so does the waiting time for it to be tested again.

The result of the Leitner system is that you are allowed to prioritize your studying, focusing on the flashcards that are troubling you when you are keen and reviewing the easier flashcards when you want a lighter study session."

2.3 James Heisig's Remembering the Kanji Method

James Heisig is famous for his work in the book "Remembering The Kanji". There, he explained about a method that helps the student mainly of non-Japanese to learn and memorize the Kanji characters. Previously, the teaching of the Kanji characters were based on the way it was taught to the Japanese children. This means Kanji that has important or frequently used were taught regardless of its difficulty. For instance:

Dream (夢) v. Eye (目), Evening (夕)

From the Kanji characters shown above, we can find the problem. The kanji 夢 seems difficult to be written by a foreign student who is a beginner in Kanji writing. However, since the meaning is quite popular (dream), therefore they will be learning it at an early stage according to traditional method used to teach Japanese kids. But, an adult will find it more difficult since it looks complex. Even the mathematicians agreed the most logical way to teach something to someone is to have the teaching to be started from the basic and have the difficulty level increased gradually. This is to promote confidence as well as long term memory.

Back to the Kanji character 夢, it is actually made up from 2 different Kanji which are 目 and 夕. Logically the latter one should be taught first as they are the basic form of Kanji/radicals. These radicals will be combined with one another to form another complex Kanji. So from the Kanji 目 we

can make other more complex Kanji characters such as 見 (see), 具 (tool), 真 (truth) and many more.

As it turns out Mr. Heisig uses this theory he discovered to help foreign adults who are learning the Kanji characters. Kanji characters are grouped and arranged in orders from the simplest to the more complex one regardless of their actual meanings. This way it helps the students to be able to join the pieces together as they will learn the basics/radicals first before proceeding to the more complex characters. Not only that, he also devised a way to remember the Kanji characters – by having stories associated with each Kanji characters. For example:

> **目 = "By turning it sideways you can actually see an EYE"**
>
> **見 = "In order for the 'eye' to SEE everything in the world, it must move its 'legs' and go travel around the globe.**

There's been criticism on this theory. Among that were:-

1) It's just a bunch of illogical mnemonics.
2) Obscure Kanji are also taught, sometimes at an earlier stage than a more useful and famous one.
3) The theory is for learning the meaning of single character at a time, not its reading nor compound words (a combination of 2 or more Kanji characters)

Based on my research on few websites discussing this, I found out about the logical explanation behind each criticism. For instance, for the first criticism "It's just a bunch of illogical mnemonics", Heisig's method is more like a story-visualization method where students are required to form a mental imagery/visualization on each and every Kanji characters. Though sample stories were given, but students are welcomed to make their own. It's easier that way since the story will become more vivid.

On the second criticism, it is sort of true. For example, Kanji like 旬 (decameron) are taught early compared to the Kanji 鳥 (bird). But, Mr. Heisig has his own reason. Based on the stroke count, 旬 only got 6 strokes while 鳥 is 9 strokes. The latter are more complex and chances are students will struggle to write it let alone to memorize it even though the meaning is pretty useful (how many times do we hear "decameron" in our daily speech as opposed to "birds"?). The method devised by Mr. Heisig strives for literacy in ALL the characters, not just a few hundreds.

The third criticism talks about how this method doesn't teach students actual Japanese. Meaning to say students won't become fluent immediately when they finished with the method. It is true, but there's a valid reasoning behind it. The strategy "divide and conquer" was put in mind when he devised this method. This means students are presented with one challenge at a time. Surely, the Japanese learn Japanese grammar, vocabulary and writing at the same time but this won't work with foreign students. Learning the Kanji meaning first without its reading will allow students to focus on the meaning and its character.

CHAPTER 3
METHODOLOGY

3.1 Case-Based Reasoning (CBR)

For research, the Case-based Reasoning process will be used to determine the problem with the previous system. Then solutions for each problem will be acquired. Below are the steps underlined by the CBR method:

1) **Retrieve:** Given a target problem, relevant cases are retrieved from the memory. A case consists of a problem, its solution, and explanation on how the solution was found.

2) **Reuse:** The solution from the previous problem is then mapped to the current problem. Perhaps some adjustments need to be made to ensure the problem can be solved with the given solution.

3) **Revise:** Having mapped the previous solution to the target situation, the newfound solution will then be tested and results will be collected for future research. Should the solution fail; it will be revised again to see where it went wrong. Then, a new solution can be derived from that.

4) **Retain:** After the solution has successfully solve the problem, the result will be stored inside the memory. This can be used in the future to solve other problems.

3.2 Rapid Application Development (RAD)

For development purposes, Rapid Application Development (RAD) had been chosen. According to Wikipedia, it is defined as "a software development methodology approach, which involves iterative development and the construction of prototypes".

Steps involved in RAD are:

1. The system requirements will be listed down in a detailed manner.

2. A draft feature of the system will be designed on paper.

3. From the draft, a working prototype will then be built. This prototype should mimic the real software in terms of characteristics and features.

4. Based on the first prototype, a second one will be created with the following steps:

    - Evaluating the first prototype in terms of its strengths, weaknesses, and risks;
    - Defining the requirements of the second prototype;
    - Planning and designing the second prototype;
    - Constructing and testing the second prototype

5. Should the need arise, the third prototype might have to be built by following the steps in (5)

3.3 Key Milestones

Key milestones are important events during the development of the said projects. It lists down vital stages that can be used indirectly to determine

how far the progress is. As for my project, they were shown in the table below:

Key Milestones	**Status**
Research and propose a FYP project	Done
Research on the functionalities to be included in the software	Done
Design the software process flow	Done
Develop the storyboard / User Interface Design	Done
Review the storyboard / User Interface Design	Done
Build the prototype	Done
Evaluate the prototype	Done
Redesign the second prototype	In Progress
Build the second prototype	Not Done
Evaluate the second prototype	Not Done
*Continue with next prototypes should the need arise	Not Done
Build the actual software	Not Done
Review the actual software	Not Done

Based on the key milestones shown above, I can conclude that almost 70% of the process had been completed. The next step would be building the prototype. Regarding the prototype, the actual number of prototypes that I am going to build may change from time to time. Should I find the second prototype to be somewhat lacking in meeting the requirements set earlier I may have to build the third and so on. The important thing is with prototypes; any possible bugs could be detected and fixed earlier so they won't be there in the final build. Also, this is to ensure that all the said features will work correctly with each other.

3.4 Gantt Chart

For Gantt chart, I just followed the suggested ones from the FYP Guidelines. As of now, we are in week 7 where the Progress Report II is

about to be submitted. By referring to the Key Milestones I had prepared earlier, one can tell that I am now in the stage of building the prototype. The project is a bit late from the specified time frame. I have to really push for completing the project so it can be finished well before the Pre-EDX which is in Week 10.

NO	Detail/Week	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1	Project work														
2	Submission of Progress Report II														
3	Pre-EDX														
4	Dissertation														
5	Viva														
6	Final Dissertation														

3.5 Tools Required

In order to finish the said project, several tools will have to be used. Overall it is into three groups – the software, the programming language, the equipment.

3.5.1 The software

Among the software required would be Microsoft Access 2007 and Adobe Flash PRO CS4.

- Microsoft Access 2007

  Apart from holding the data (Kanji characters, related information, etc), this software will be used in developing the main application. This is because it is possible to

design and develop most type of applications with Microsoft Access's Form.

- Adobe Flash PRO CS4

  The animations are going to be pretty basic ones so I will not face problems in choosing the right software. However, I had decided to use Adobe Flash PRO CS4 since it's already available in my computer.

3.5.2 The programming language

The programming language that I am going to use is Visual Basic for Application (VBA). This is because it can be used with Microsoft Access 2007 as mentioned earlier to develop the application. Plus the language itself is quite capable of developing medium complex application. I had some experience in using it during my internship where I had to develop software that used a database. Therefore there should not be a major problem to use the language. Apart from that, SQL will be used too in making queries and so on.

3.5.3 The equipment

Basically, the equipment that I am going to need is just a workstation/computer with both Microsoft Access 2007 and Adobe Flash PRO CS4 installed. Probably for testing purpose later on I would have to use a couple more of computers that have different specifications other than the one I am using to develop the application. This is to ensure that the application will work as intended with other computers.

CHAPTER 4
FINDINGS OF THE STUDY

4.1 The components of the software

The components are important as it can tell a lot from it. "How it works?", "What interaction will take place?", "How will the software behave with regards of a given condition?" and many more are among the questions which can only be answered by understanding the very foundation of that software – the components that make it up. Thus I have discovered a few of them that are vital to be included in the software I am about to build as shown below:

1) User Interface

- User Interface is one of the important components of software as it is what the users will see when using the software. As such the User Interface should be easy to navigate and meaningful to the users. Else it won't serve its' purposes.

2) Database

- Database is a collection of organized data that has its function. For this software, the data is going to be Kanji characters, user profiles and many more. Later on I would have to think on how to set up the database system to be used for the software by considering the compatibility and reliability of that system.

3) Account/Profile management

- Account or profile is indeed important especially for my software. This is because this software is not intended to be exclusive to one person per one

computer. In other words it means the software can be used by more than one user on the same computer. Not only it is better, but also useful since different people will have their own study progresses. For instance whatever progress made by person A will not affect person B's progress.

4) "Study" section

- "Study" component is where the major learning will take place. Here, the users can browse through the list of the Kanji characters as they wish, read the stories made to help memorizing each Kanji characters, see how to write each Kanji characters and so much more. In short, in this section I will try to include as much learning material/ways as possible so the users can reap maximum benefits from each lesson.

5) "Review" section

- "Review" component is where the test will take place. Each time the users studied the characters, they will have to take tests to ensure they managed to memorize it. This is the most important part of the software since reviewing will take place most of the time. Furthermore complex calculations and algorithms will probably be use d in this component to calculate the flashcard's review time and so on. As such I have to come up with the formula and properly test it later on.

6) "Option" section

- "Option" is where the minor tweaking of the software can be done by the users. They will be able to manage their profiles, edit the windows layout and many more.

4.2 Comparisons between available courseware

This part is meant to point out what areas are still lacking in the current available courseware thus further strengthening out the reason why the development of "Kanji Learning Courseware" should be continued. All these information were acquired during previous research.

	ANKI	Pablo Chinese Dictionary	Kanji Koohii. Com	Kanji Gold	JFC	ReadWrite Kanji
Is it free?	✓	✓	✓	✓	✓	✗
Animation to assist writing?	✗	✓	✗	✗	✗	✓
Applies Leitner Flashcard System?	✓	✗	✓	✓	✓	✓
Applies Heisig's Story-visualization Method?	✗	✗	✓	✗	✗	✗
Compatible with hand-held devices?	✓	✗	✓	✗	✓	✗
Does it include the pronunciation guide with sound?	✗	✗	✗	✗	✗	✗
Can it recognize the character handwritten by the user?	✗	✓	✗	✗	✗	✗

Table 1: Comparisons between the available courseware

Based on the above table, a few software/courseware have been put together along in order to do some comparisons. The features tested including whether it's free or paid software, include animations to assist in writing the characters, apply Leitner and Heisig's methods, compatibility with hand held devices, include voice pronunciation guide and the ability to recognize characters handwritten by the users. These features are among the key and interesting features to be integrated in the "Kanji Courseware System". However, due to the time constraint maybe not all planned features will be incorporated but most of them will be.

For the first feature, we can see that most of the coursewares are made free to public. This is important as being free means everyone have access to use the software. But it has one major drawbacks; paid software usually perceived to contain more features and works better in the eyes of the public. I would definitely strive for a free, more usable courseware to match the expectation.

For the second feature, most of the software only list down stroke orders. This is done by putting numbers in the character, indicating the order of writing. Below is the example of it:

Stroke orders, indicated by the red dots with numbers inside them are decent, but less effective in a way. This is because it doesn't show how it's drawn. There are few rules to write the strokes in the correct direction and sequence:

Stroke direction

1) Horizontal strokes are written from left to right

2) Vertical or slanting strokes are written from top to bottom (with a few exceptions)

3) A stroke may change direction several times

Stroke order

1) From top to bottom

2) From left to right

3) Middle part before short flanking side-strokes (with a few exceptions)

...and the list goes on

Bottom line is, drawing a Kanji character is not as simply as copying the shapes and lines. It has rules to follow in order to write the character correctly. This is where the animation shines through.

For the fourth feature, only one software uses Heisig's method of story-visualization. The rest simply employ the memorizing the characters as it is without incorporating stories to make it more easier. As for the next feature, we can conclude that not all software compatible with hand-held device. This is an interesting feature to include in "Kanji Learning Courseware" since it might attract the young and hip people to use it as it offers more convenience and such. I believed with the use of Microsoft Access, it's going to be much easier to make it compatible with hand held device. I need to research more on this.

Lastly is the ability to recognize handwritten Kanji characters by the users. This is the most complex feature of all so I can't really promise to integrate it in the software I am building. However, it is a great feature since very few software had it.

4.3 Prototype

Right now I am in process of building a working prototype. I decided to work on functions first instead of the design because beautifully designed but malfunctioning software is no good at all. So far I had completed the Study Section. Next agenda would be to add the Review Section which is one of the important function of the software.

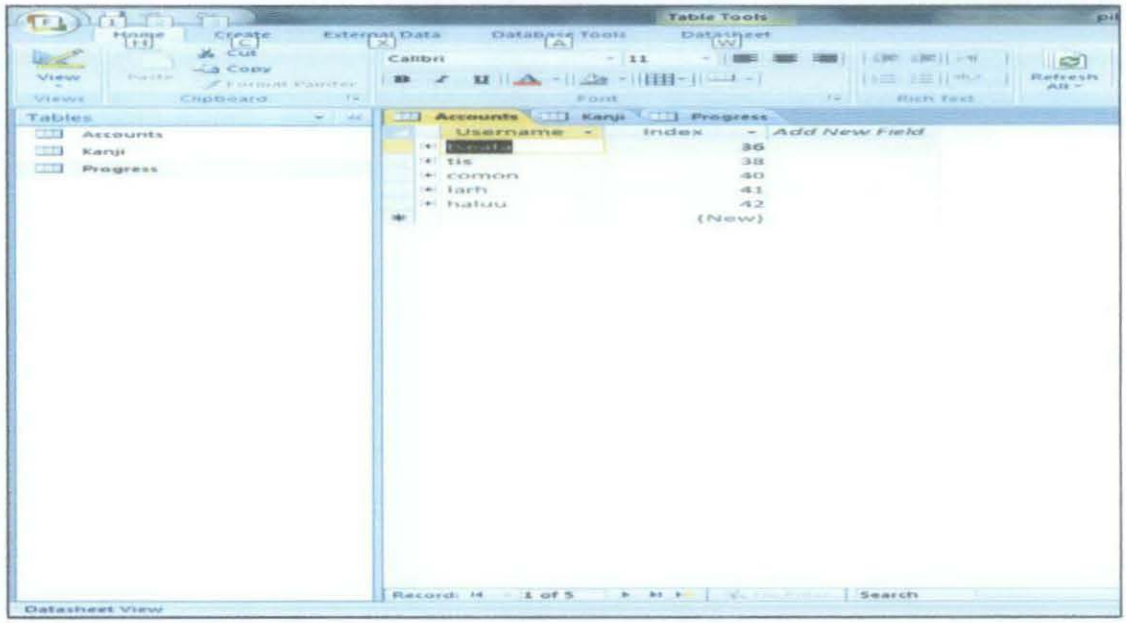


Figure 1 : The Accounts Table

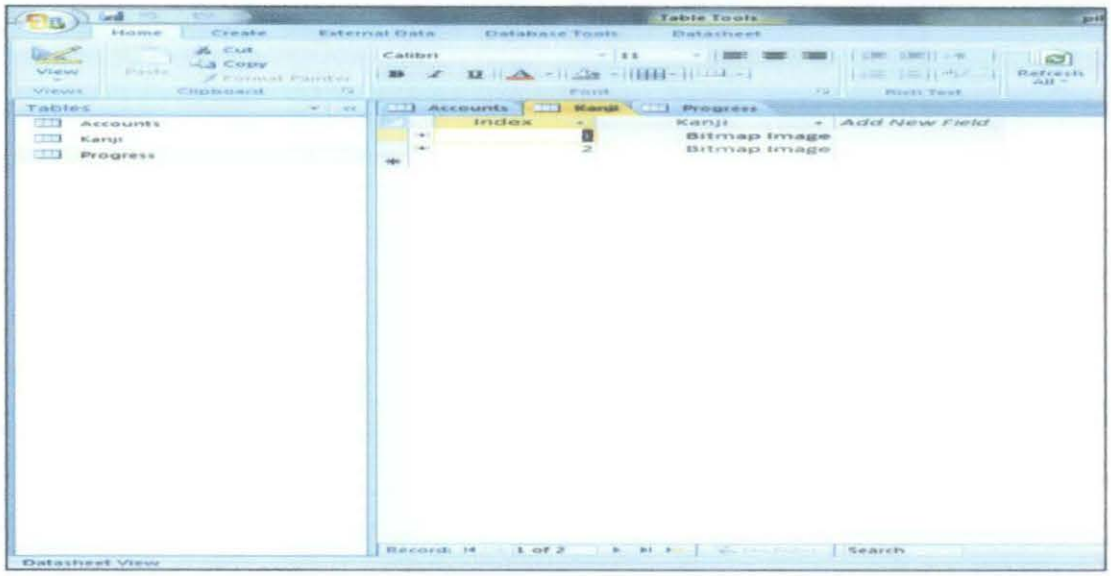


Figure 2 : The Kanji Table

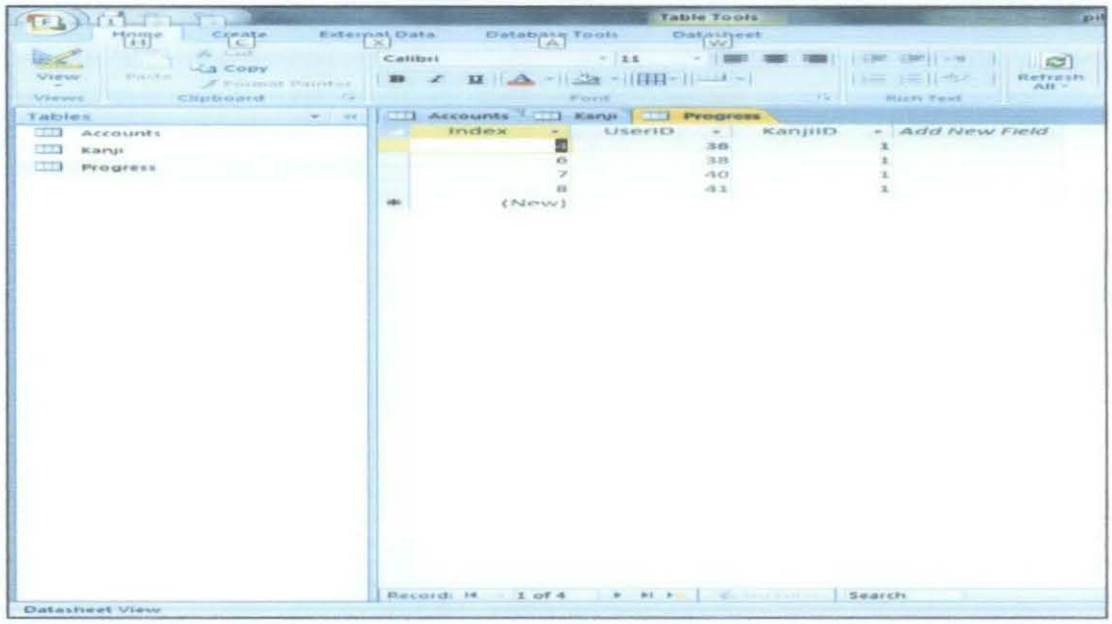


Figure 3 : The Progress Table

The images shown above are the snapshots of the tables used. The values are purely for testing purposes. In the first table, it stores the accounts of the users. It will be used later on to track the progress of each user. There are no passwords required; users simply pick their usernames and they can start right away.

For the second table, it stores the Kanji characters. Right now, only 2 Kanji characters are used. This is where the users get their Kanji database from. And lastly,

the Progress Table is where both Accounts table and Kanji table are joined together. This is how their progress is being stored. Each username (represented by UserID) may have one or more KanjiID (representing the Kanji characters) assigned to them.

Users interact with the software through the GUI which are implemented using Forms. Each form will deal with the respective tables according to its' function - a register page will have to utilize the Accounts table for instance. Below are the screenshots of each "page" excluding the "Review" page.

Figure 4 : The Log In Page

Figure 5 : The Progress Page

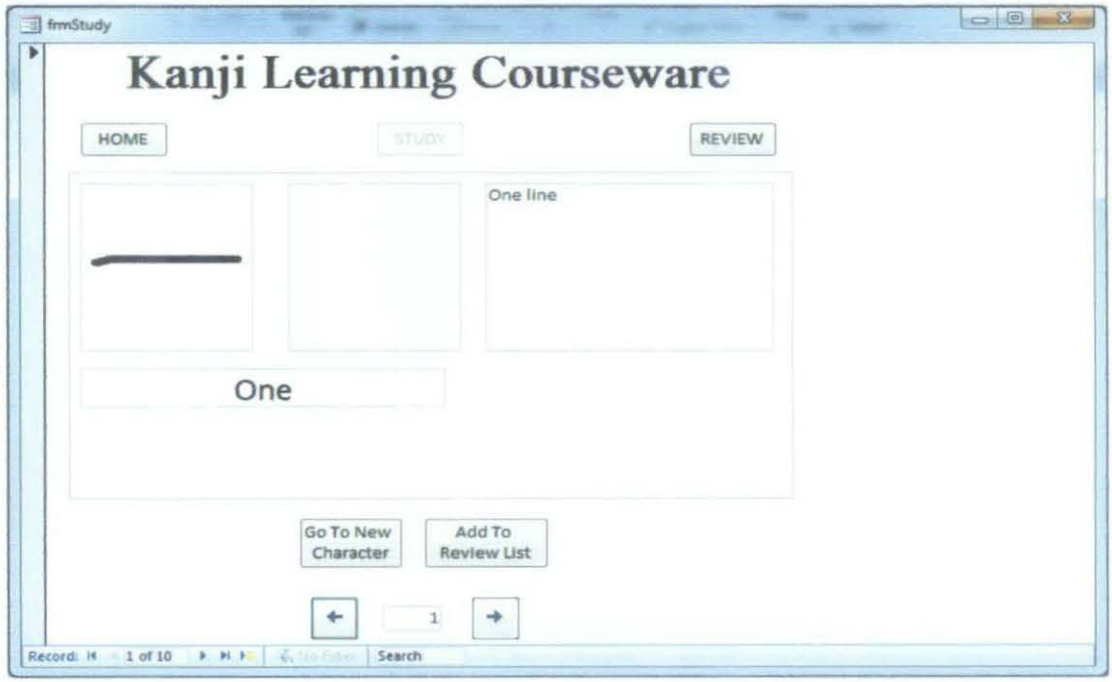


Figure 6 : The Study Page

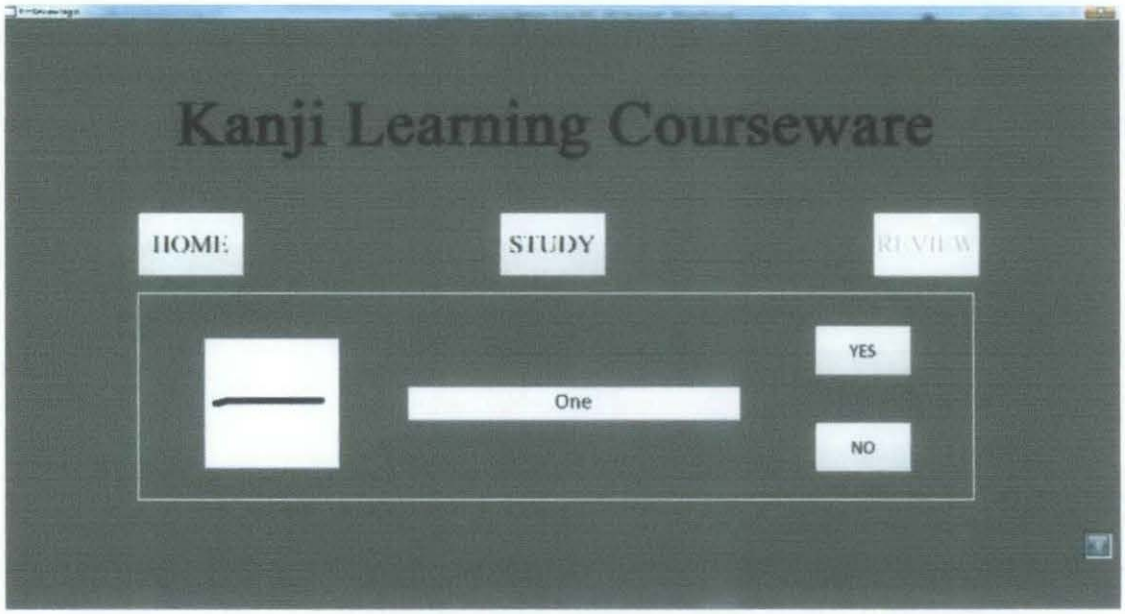


Figure 7 : The Review Page

In the Login page, users will be prompted to select their username from the drop-down menu. Only usernames that had already been registered will be shown there. Next, the users can press "Log In" button to proceed. They will then be brought to the "Progress" page where their latest achievements will be displayed.

From here, they can choose to either go to Study page or Review page. Which bring us to the next image, the Study page. It's not 100% finished but from what's already there, one can conclude that here's where the users will be presented with various information to help them to study that particular character. There will be animations to guide them in terms of writing, readings in both Kun'yomi and On'yomi as well as the meanings, a space where users can save their own stories and so on.

In building the GUI, many factors were taken into considerations. Among them were consistency, ease of use, navigation and aesthetic. For the first factor, consistency is defined as following a similar pattern. In this case, the GUI would have to be consistent so that users won't have to struggle to navigate through the page. As we can see, the layout of each page follows a similar pattern where the buttons are placed on top while the content beneath it.

Next, the ease of use factor. Functionality alone doesn't make a software great. This is because to ensure that people who use the software can reap the benefits provided, it has to be easy to use to say the least. In this courseware we can definitely see the efforts to make the usage a lot easier. Labels, proper layouts, and simplicity are meant for one thing - to assist users when using the courseware.

Finally, the aesthetic factor. Though the prototype seemed lacking in such feature, but it is planned for the final courseware build. This is done to add more appeal to the courseware to the users, attracting them to use it.

CHAPTER 5
CONCLUSIONS AND RECOMMENDATIONS

5.1 Conclusion

As a conclusion, the software that I am working on is relevant to the objectives that I had set earlier. This is because each of the objectives are addressed and made as guidance in developing the software. Not only that, prototypes that will soon be built will become a real life indicator on how much has the objectives being addressed/implemented. The timeline for developing the software is deemed enough to complete. Hopefully when this software come out later on, it will successfully serve its purposes and work as intended.

5.2 Recommendation

Among the recommendation that I got from my supervisor as well as during my research would be:

1) To include the Japanese readings for the characters. This way the students can learn more about the characters than just meanings. Also, it would be handy for the study of Japanese language, both spoken and writings as well.

2) To teach how to read compound words too. Compound words are combinations of two or more Kanji characters. By learning compound words it will help the students in learning how to read the Japanese writings. Also, it can build up their vocabulary skills.

3) Find out research papers that are related to the subject I am researching right now

4) To add some more functionalities that are suitable to increase the product's selling point. For instance, pronunciation guides, writing animations, and so much more.

5) To explore the possibility of using other kind of tools to develop the courseware since Microsoft Access has its limitations. Among the tools recommended are VB.NET, and Java.

REFERENCES

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6) Pablo English Chinese Dictionary software.

7) Teach Yourself Japanese, Hodder Education Ltd.

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APPENDICES

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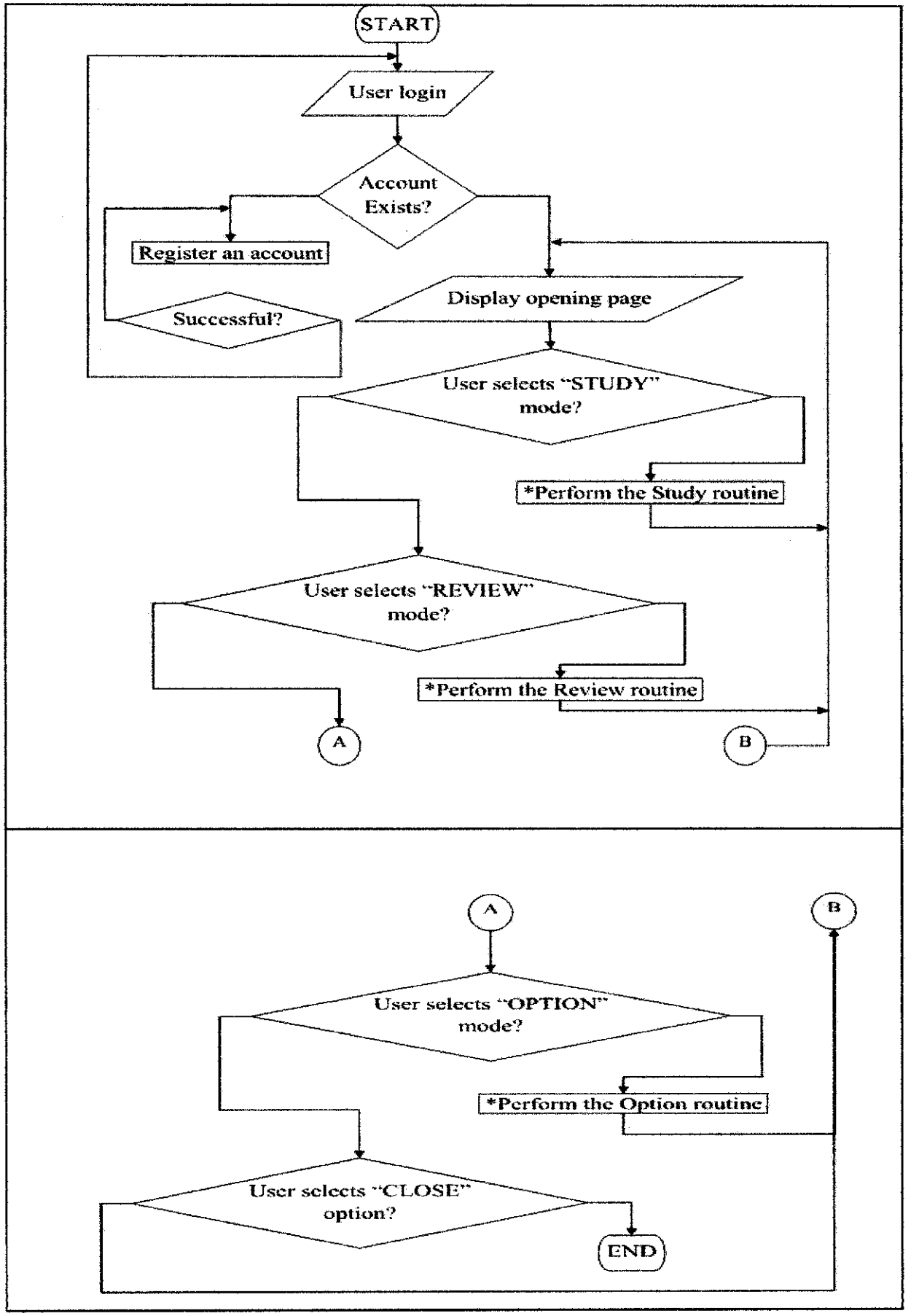
A-1- Flowchart of Kanji Learning Courseware (Macro Level)



A-2- Screenshots of ANKI software