TOEIC Contents Design Considering the Different Functions of the Brain

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Abstract

Educational multimedia content is widely used for learning materials but their design is rather complex because we have to consider both logical and emotional elements in the context of the learning process[1]. In this paper we suggest the use of multimedia with game feature as Kolb’s learning modes of active experimentation and concrete experience in the learning cycle. This paper also proposes the usability principles for the content design to improve the effectiveness of the multimedia learning material such as game content. We have recognized the arrangement of text on the left might trigger the left side of student’s brain more quickly and the arrangement of the video on the right side engages the right side of brain. Moreover it may accelerate the communicative channel circuits between the left logical process part of the brain and the right emotional part. We present one such example of test TOEIC multimedia content with a game feature.

Keywords: Toeic, Usability, Brain, Eye-tracking, F-shaped, Readability

1. Introduction

What is the multimedia’s role in education? We will attempt to use Kolb’s learning theory and modes along with multimedia techniques in our effort to improve learning skills.

It is always difficult to get the student’s attention when it comes to educational material[2]. Perhaps using the F-shaped scanning pattern, easy readability, and comic elements, we may more likely engage their interest.

The F-shaped pattern was found to be effective in reading multimedia content. This study was carried out by Jakob Nielsen[3], a pioneer in the field of usability. His eye tracking study on the reading habits of multimedia content users shows that they exhibited an F-shaped pattern when scanning multimedia content. A similar study[4] was conducted by Enquiro, a marketing firm, with Eyetolls, an eye-tracking research firm, whose study showed a similar pattern. The use of this F-shaped multimedia content increases the possibility of catching the student’s eye.

Easy readability of text in educational content is crucial because it improves comprehension and enhances the likelihood that a student will continue reading to understand the course material. We consider font type, font-size, line spaces, background/foreground contrast, as well as word spacing.

Readability study[5] showed that text with no margins was read faster but with less comprehension. Text with proper margin setup helps students to pinpoint important content.

People normally read and write from left to right and top to bottom. This can be the reason why students spend a majority of their attention on the left side of multimedia contents (69% of the time) according to Nielsen’ eye tracking study. For a user friendly interaction, we list test problems with related images and let the student check their answers visually. The right answer is marked by graphical “O” and the wrong answer is shown with graphical “X”.

This paper elaborates on our efforts to satisfy these principles. Chapter II identifies multimedia for learning material, Chapter III elaborates on control flow required for our TOEIC content. Chapter IV describes the content implementation including a game feature and chapter V concludes with further considerations.
2. Multimedia for learning material

Kolb feels that the learning process has 6 main characteristics:
- Learning can be thought of as a process.
- It is a continuous process.
- Learning is a resolution of information.
- Learning is an adaptation of information.
- It is interaction between people and world around them
- It is a process of creating knowledge.

His theory sets out 4 different learning modes which constitutes the learning cycle. The active experimentation mode needs an actual environment for learners to participate in. The cost is usually expensive, but multimedia such as augmented reality, virtual reality, audio visual, etc. can substitute the real environment with more features. The cost is relatively small. For the concrete experience, we can add haptic devices in addition to the above multimedia for artificial touch senses. For the reflective observation, we can videotape what happened for repetitive observations. The graphical presentation could help abstract conceptualization.

Entry to the learning cycle can be at any point but most useful if all 4 stages are utilized. Three different examples of entry into the learning cycle are:

1. learning software program; starts with active experimentation going to reflective observation onto abstract conceptualization and onto concrete experience.
2. learning algebra; start with abstract conceptualization moving onto concrete experience then active experimentation ending with reflective observation.
3. TOEIC listening skills: start with active experimentation moving onto reflective observation then abstract conceptualization ending with concrete experience.

Other learning theories based on cognitive structure[6,7,8] and reward[9,10] are also considered. European researchers believe that human’s cognitive structure can be altered by “learning experiences”. Trying to decide which theory best stimulates student’s learning capabilities is an ongoing dilemma. However, multimedia can be one way to create new learning experiences for students.

3. Basic Content Flow Control

The introduction to the multimedia content welcomes you with a video. The first button leads you to the study mode where you can hear someone speaking slowly in detail about the question under study.
In this mode, you can listen to both the explanation and answer. The second button leads you to the test mode where you can participate in an actual test.

The two modes show 20 different questions identified by a specific icon image related to the question. When you choose an icon, you are then engaging in a specific problem. If desired, you can go back to the main menu and choose the study mode. When you are engaged in a problem, you can see the complimentary text by pressing the button “see text”. When you finish you are allowed to check your results immediately.

Once you have finished a problem in the test or study mode, you can move on to the next problem in one of three ways: (1) to engage in the next or previous problem (2) to engage in a problem selected randomly, or (3) select a problem from the 20 icon images by yourself. If you are not satisfied with the score result in the test mode, you can go back to the study mode for a better understanding. When you are satisfied with your work, you can go to the test mode immediately to check your achievement.

The study mode provides more question practice related to the selected problem. The speaker reads the text with additional comments and then the student perhaps more readily understands the topic. The detailed flow chart of the content is shown in the following figure.
Fig. 2 Flow Diagram of Content Pages
4. TOEIC Multimedia Contents

4.1 Intro

To attract the attention of students, we show cartoon character faces in the intro page. The students can choose their favorable character or can use a cartoon of their own face. In Fig.3 we see 4 faces including two user’s cartoon faces.

The page includes a video saying “Welcome to TOEIC Listening” and two image buttons, a study and a test button. By clicking the study button, the student can go into the study mode where explanatory listening material is provided with more practice questions. In the test mode, the student should solve the questions without any help, but the student can read the question text[5] if he is not confident in listening.

4.2 Two Test Pages

To satisfy the F-shaped content, we lay out the content as shown in Fig 3. But the video on the left side in this arrangement distracted student’s attention and neglected the importance of the solving the question. So, we exchanged locations of the video and the question texts as show in Fig 4 with the text on and in Fig. 5 without the text.

This arrangement of text on the left might trigger the left side of student’s brain more quickly[6,7,8] The arrangement of the video on the right side engages the right side of brain and students seem to be enjoying the pictures.

These two arrangements may accelerate the communicative channel circuits between the left logical process part of the brain and the right emotional part.
Hi, Don Madison here, host of the KORG-FM afternoon show. My dog, Spot, loves to run. The trouble is, she was always running out of our yard into the neighbors’ yards. Once, she even ran into the street and nearly got hit by a car! That’s when I called my friends at InvisiFence. They came right over, explained their program, and within a couple of hours had erected an invisible barrier around our yard that keeps Spot on our property just like a real fence would. Spot can now run happily around our yard, and me and my family don’t have to worry about her running away. The installation process was smooth, quick, and surprisingly affordable — much cheaper than putting a real fence around our yard would have been. If you’re looking for an effective way to keep your dog on your property, call InvisiFence now. They’re right here in town, at 789-987.

Fig. 4 A Page with video on the left

Fig. 5 A Study Page
4.3 Game Page

To extend previous TOEIC content, a game feature with a pop-up window was created to solve a question in a different way. Two players A and B, each have a monitor with, example, 3 problems on a page shown in Fig.7. Each problem has 4 choices. Each player makes their choice of responses to the question. Then a pop-up window for each player can be displayed on each monitor to reveal each other’s results shown in Fig.8.

The game content presented here shows some basic features.
5. Conclusions and Further Considerations

This paper identifies the validity of educational multimedia content using Kolb’s learning mode and suggests the use of an innovative user interface design. The problem with designing an effective user interface however is how to coordinate the logical educational material with the emotional fun part.

We proposed the use of the F-shaped pattern in the content design with the logical elements such as text on the right side and the emotional elements such as image/video on the left. The TOEIC multimedia content shown here follows this guide and shows its effectiveness.

To make interface useful and effective a usability testing procedure was required to discover if users can grasp the necessary information.

For further study Kolb’s learning styles along with other learning theories should be investigated to make better use of multimedia. The game content should also be improved to include new features to attract students.

We propose to use the F-shaped pattern in the content design and arrange the logical elements such as text on the right side and the emotional elements such as image/video on the left for proper brain function. The TOEIC multimedia content shown here follows this guide and shows its effectiveness.

For the validity of this interface, we should go through a usability testing procedure. The procedure discovers if users can grasp what they need to do, and what is necessary to make the interface more useful.

6. References

[12] http://fie-conference/fie95/3a2/3a22/3a22.html,