Applying Gagne's Events of Instruction in a Computer-Based Test Preparation Listening Material Design

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Abstract—The advances in computer technology have brought the rise of computer-based instructional materials in many different fields including language learning. With regard to listening skill development, one obvious strength of the computer-based instructional materials is its capability of presenting audio component in various ways to improve students' listening skill. For students who are preparing themselves to take a standardized test like Test of English as a Foreign Language (TOEFL), the materials can even be designed to provide a high degree of customization that can be geared specifically to meet students' pace of learning. However, it can be a big challenge to design a computer-based listening material capable of ensuring that learning indeed takes place while the students are using and exploring its contents. This paper aims to propose the application of Gagne's nine events of instruction in a computer-based test preparation listening material design. More specifically, this paper tries to provide guidance in the process of developing the user interface and the content presentation within the material as to match each part of the nine events. It is expected that this strategy will successfully activate the required cognitive process of the students and help them achieve established learning objectives.

Keywords— Gagne's nine events of instruction; computer-based; listening

I. INTRODUCTION

One of the most popular standardized language test is Test of English as a Foreign Language (TOEFL). Despite its main purpose as one of the requirements for enrollment to North American universities, it is widely used for academic, scholarship application, and employment purposes in Indonesia. Students in Universitas Negeri Semarang, for example, are required to obtain certain TOEFL scores before being admitted to attend thesis or dissertation exams (Mundzir, 2016). Candidates of graduate programs in many universities even have to meet certain minimum scores for enrollment eligibility (Sekretariat Pendaftaran Pascasarjana ITS, 2018). As for scholarship applications, applicants may need to present TOEFL certificates when applying for LPDP (Lembaga Pengelola Dana Pendidikan) scholarship, a scholarship program from the Ministry of Finance (Kemenkeu RI, 2018) and

Beasiswa Unggulan Masyarakat Berprestasi, a scholarship program from the Ministry of Education and Culture (Kementerian Pendidikan dan Kebudayaan, 2018). For employment purposes, TOEFL may be needed by those applying jobs at PT Pertamina (Simorangkir, 2018), PT Taspen Persero, (PT Taspen (Persero), 2017), PT Pindad (Sari, 2018) and many other institutions.

Interestingly, the test format which is still widely adopted is the TOEFL ITP (Institutional Testing Program) format, a paper based test format of TOEFL. In this regard, instead of using the score range from 0 to 120 based on the latest TOEFL iBT format, both academic and non-academic institutions use the TOEFL ITP score range, from 310 to 677, as the reference for English proficiency. Candidates of a master's programs at Institut Teknologi Sepuluh November (ITS), for instance, must have a minimum score of 400 and those applying for a doctoral program must have a minimum score of 450 (Sekretariat Pendaftaran

Pascasarjana ITS, 2018). Applicants for a job at PT Pindad, on the other hand, are required to have a minimum score of 475 (Sari, 2018).

II. LITERATURE REVIEW

A. TOEFL ITP

TOEFL ITP uses multiple choice question format in which each question has for options marked A, B, C, and D. This test consists of three sections, Listening Comprehension, Structure and Written Expression, and Reading Comprehension. Listening Comprehension section consists of 50 test items, Structure and Written Expression section consists of 40 test items, and Reading Comprehension section consists of 50 test items (Educational Testing Service, 2018). The Listening Comprehension section has three parts, short dialogs (with one question for each dialog), long dialogs (with several questions for each dialog), and talks (with several questions for each talk). The Structure and Written Expression section has two types of questions, sentence completion and error identification. The last section, Reading Comprehension, presents several passages, each followed by several questions, with topics relevant to academic environment.

Among those three sections, Listening Comprehension is considered more difficult than the other sections (Rohani, 2010; Maisarah & Suciati, 2014). Rohani (2010) explained that this section was difficult as it required test takers to have sufficient exposures to North American English and understood the structure and vocabularies used in the presented expressions. Maisarah & Suciati (2014), on the other hand, suggested that the listening section was difficult because test takers only heard each material (i.e. conversation, talk, etc.) and question only one time.

B. Computer-based instructional material

Computer-based instructional material in this paper is a form of computer-based instruction. This type of instruction is defined as a method of instruction where the computer is used as the delivery medium for students and where the computer contains the instruction which is aimed to teach, guide, and test the students until the target proficiency level is achieved (Jenks & Springer, 2002). This definition implies that a particular

material presented in a computer is not automatically classified as computer-based instruction unless it is intentionally designed for systematic instruction to occur and that learning goals can be attained. The definition also means that computer-based instruction is a complete package of instruction that can be set to be independent from other knowledge objects in providing meaningful learning experience for its users. In fact, it does not require the presence of other supporting media nor an instructor to make the learning goals achieved.

Computer-based material has proved to offer many benefits in students' learning. As Foster & Fletcher (2002) summarizes, there are basically five advantages of using such material: accommodation of the learning pace, flexibility of content sequence, adjustability of content presentation, adjustability of the difficulty level, and accommodation of learning style. In terms of learning pace, the material allows students to navigate and explore the content of the instruction in accordance with how much time they could spend in achieving the learning goal. The flexibility of content sequence means that the material provides students with options to choose different order of content and its sub content presentation when necessary. The adjustability of content presentation in computer-based material is the feature that enables students to receive different material depending on what they have mastered and what still need to improve. The adjustability of the difficulty level refers to the ability of computer-based material to be designed with varying levels of difficulty that can then be selected or automatically fed to match the students' mastery level. The last advantage, accommodation of learning style, reflects the rich content of computer-based material suitable for different learning styles, especially verbal and visual ones.

C. Test preparation listening material

Test preparation material means an educational course, tutoring service, educational material, or a learning tool designed to increase students' performance on standardized tests (Wikipedia, 2018). The computer-based test preparation listening material in this paper refer to listening material delivered through a computer medium which is aimed to teach, guide, and test the students

Fig.1: The Dick and Carey Systems Approach Model for Designing Instruction (Dick, Carey, & Carey, 2015)

so that they have better performance in TOEFL ITP tests.

D. Instructional strategy development

Developing instructional strategies is one of the key phases in instructional design process. The focus of this phase is to develop strategies for pre-instructional activities, information presentation, including the sequence and examples, learners' participation in the form of practice and feedback provision, assessment, and follow up activities for remediation and enrichment (Ho, 2010). To have a better overview of this phase, the Dick & Carey Instructional Design Model in Figure 1 can be used as a reference.

As illustrated in the model, the instructional strategy development phase is conducted after the completion of the previous five phases: assessing needs to identify the goals, analyzing learners and contexts, conducting instructional analysis, writing performance objectives, and developing assessment instruments. Therefore, it is only possible to consider what can be used to motivate learners, how the information in the material will be sequenced, what kind of practices will be provided, and what activities to promote transfer, after a designer has conducted the need analysis to identify the learning goals, identified the required steps leading to the learning outcome attainment, determined what skills and knowledge the learners need to master, written well stated instructional objectives and enabling objectives, and constructed the test items for the instruction.

This paper focuses on the instructional strategy development of the test preparation listening material and, therefore, assumes that detail data collected and developed in the previous phases has

been made available. Reference to the data is mandatory and must continually be done to ensure that the strategies used will lead to meaningful learning and the attainment of the learning objectives.

E. Gagne's Nine Events of Instruction

Nine events of instruction is one of the three components incorporated in Gagne's theory of instruction. Besides the nine events, the theory includes the taxonomy of learning outcomes and conditions for learning (Driscoll, 2005). While taxonomy of learning outcomes details the humans' learned capabilities (i.e. verbal information, intellectual skills, cognitive strategies, attitudes, and motor skills) and conditions for learning explains specific learning conditions required for the attainment of each those outcomes, the nine events are the strategies to activate the learners' internal cognitive process, which is related to the conditions of learning, to ensure that learning takes place. The nine events of instruction proposed by Gagne, as presented by Driscoll (2005) are:

1. Gaining Attention
2. Informing learners of the objective
3. Stimulating recall of prior learning
4. Presenting the stimulus
5. Providing learning guidance
6. Eliciting performance
7. Providing feedback
8. Assessing performance
9. Enhancing retention and transfer

As Gagne adopted cognitive information processing theory as the basis of his instructional theory, the nine events listed above are correlated with specific internal cognitive processes. Driscoll (2005) explains that gaining attention is related to

reception, informing learners of the objective builds expectancy, stimulating recall of prior learning triggers retrieval of working memory, presenting the stimulus is related to selective perception, providing learning guidance provides semantic encoding, eliciting performance is related to responding, providing feedback is for reinforcement, assessing performance is for retrieval and reinforcement, and enhancing retention and transfer is related to retrieval and generalization. Each of the events is, then, an external support that activates the specific internal cognitive process so that learning occurs meaningfully and successfully.

III. PROPOSED APPLICATION

In the following section, more discussion on the application of Gagne's nine events of instruction in a computer-cased test preparation listening material is presented. Each of the events is elaborated as to provide a clear view of how they can be properly applied. The figures provided serve to illustrate the points in the implementation of the event and should not be regarded as the only design applicable.

A. Gaining Attention

Capturing the learner's attention is essential as learning occurs well when the learner is oriented and receptive to information which is going to be presented (Driscoll, 2005). Since the computer-based test preparation listening material only relies on the pre-integrated aspects, especially the user interface and the way the information is presented, to gain the learner's attention, it should provide features and elements that can gain and regain the learner's attention from when the instruction starts to the end.

At the beginning of the material, an interesting but simple and informative title page can be used (Figure 2). This title page or splash screen contains the basic information about the name of the instruction and its author (Alessi & R., 2001). Other features like audio or animation can be used to attract the learner's attention but care should be given as not to distract them. Providing an animation about the process of listening or lengthy talks about the importance of listening comprehension is not necessary. Since this initial page will appear anytime the learners start the

instruction, an option to skip it should be available by clicking the mouse or pushing a keyboard key (Alessi & R., 2001). Another approach by providing an option for not showing this screen can also be integrated.

Fig.2: Splash Screen

After the splash screen, another screen displaying useful information about the listening section of the test can be added (Figure 3). Short information about the listening section characteristics in the test (like the number of the questions, the number of answer choices, typical topics discussed, etc.) or practical tips for the test can be effective to gain the learner's attention. The information and tips can be designed in such a way so that the learners can be presented with different information whenever they open the computer-based listening material.

Fig.3: Information Screen

Although gaining attention is accomplished by some sort of stimulus changes (Driscoll, 2005), random stimulus changes in the instruction cannot achieve this purpose. An attempt to provide this

stimulation by changing the color or form of the frame of the screen whenever the learners move to another page does not result in the desired attention for learning. Consistency is, therefore, another aspect which can support the attainment of attention from the learners.

B. Informing learners of the objective

This event is intended to activate the self-expectation from the learners. Being knowledgeable about what to learn can increase motivation and reduce anxiety (Driscoll, 2005). The learning objectives should be presented separately according to the type of listening materials the learners are going to learn. Since there are three main sections: short conversation, long conversation, and talks, three separate pages should be used. This technique is also beneficial to avoid overloading the learners' cognitive processing. The objectives for learning in the short conversation section, for instance, is only shown when the learners intentionally click on the Short Conversation tab under Skill Builder menu. Look at Figure 4 for an example.

Fig. 4: Learning Objectives

C. Stimulating recall of prior learning

For long term retention of new information, the learners need to connect it with their existing knowledge (Mayer, 2008). Stimulating recall of prior learning functions to assist the learners for encoding or transfer from short term memory to long term memory. This can be achieved by encouraging the learners to remember previously learned materials (words, lessons, etc.).

For example, in Figure 5 learners are given a question based on implied information in the conversation. To help the learners connect it with

their prior knowledge, a statement indicating that the question is related to conditional sentences is provided. This strategy will encourage the learners to use their prior learning (about conditional sentences) to be able to answer the current question about implied information successfully.

Fig. 5: Stimulating recall of prior knowledge

D. Presenting the stimulus

This event is the phase where the stimulus for learning is presented to the learners so that the goal of instruction can be achieved. Since the computer-based English listening instruction is used to help students achieve both verbal information and intellectual skills learning outcomes, the stimulus is in the form of presentation of the learning material and its presentation structure which should be arranged into meaningful chunks and able to promote such learning outcomes. This instruction should be arranged into three main chunks: Short Conversation, Long Conversation, and Talks to reflect to three sections in the listening test. Each chunk consists of pages and sub-pages which explains concepts and rules that support listening skill development.

To accommodate different learning style, various media, including texts, audio and video can be used in explaining and demonstrating the information. There may be a question why video can be used in this instruction while the actual test is paper-based. Please note that this instruction is not an instruction for test taking strategy but for listening skill building. Therefore, although TOEFL ITP is a multiple choice test and does not involve computer skills, any appropriate tool and media which can help the learners to be engaged in meaningful learning should be incorporated.

E. Providing learning guidance

The design of the computer-based listening material for the test preparation should be based on the mastery learning approach where the learners are provided with as flexible time for learning as possible and can move from one section of learning material to another upon the complete mastery of the skill required. Without the presence of a teacher, this instruction should be able to provide the most appropriate amount of guidance for the learners when needed. This guidance should address the use of the instruction itself and the subject material which is presented in the instruction. As shown in Figure 5 in the previous section, different types of guidance are provided, including tutorial, general help in using the instruction, dictionary support, and link to the desired learning material.

Some learners may need to get help in understanding the spoken content in the form of transcription. This help can be provided by providing a button to show the transcription of the text but this button should be programmed to be visible after the learners make a certain number of attempts in playing the audio of the same spoken material.

F. Eliciting performance

This event focuses on providing the learners with opportunities to practice the new skill (Driscoll, 2005). In this computer-based listening instruction, this event should be able to be initiated by clicking Practice sub menu under the main menu. A link or button at the end of a learning section should also be made available to trigger the respective section. This arrangement is necessary to ensure that the learners can access practice section directly after completing the learning session or at other time without the need to reread the material the learners have mastered.

G. Providing feedback

In this event, the computer-based listening material should be designed to provide feedback after the learners complete a certain performance elicitation. It is not sufficient just to inform the learners that their answers are correct or incorrect. The feedback should be informative so that the learners can detect and correct the error (Driscoll, 2005). In the example below, besides showing that

the learners' answer is incorrect, the feedback explains why it is incorrect and provides options for remediation.

Fig. 6: Informative feedback

H. Assessing performance

Assessing performance is the event where the learners will be formally assessed for the mastery of the new skills learned (Driscoll, 2005). Unlike in the eliciting performance event, assessing performance does not provide hints to the learners while they are working on this assessment/test. Since this computer-based listening material is intended for the learners who are going to take the TOEFL ITP, the assessment format must be designed to match the sections and contents of the real test. To activate this event, a button in the main menu should be made available so that the learners can easily access whenever necessary. The randomization feature in test construction, for both the questions and their options, should be incorporated in this assessment to discourage memorization of previous test taking experience.

I. Enhancing retention and transfer

Instructional activities to support retention and transfer are commonly built into the instruction at much earlier phases of the nine events (Driscoll, 2005). Enhancing retention and transfer in this instruction, therefore, should not be treated as literally the last stage of the instruction. In fact, it should be integrated and connected with the other events so that there is continuous support for the transfer. In the mastery learning approach, learners are engaged in learning activities and will only step into another stage of learning upon mastery of the previous skill. When the learners are given the

opportunity to explore the material, receive learning guidance, do performance elicitation, receive feedback and have assessment, they are automatically engaged in the enhancing retention and transfer phase.

The discussion above suggests that it is possible to integrate features in the computer-based listening material so that the content can be delivered based on Gagne's nine events of instruction. However, as the instruction is self-paced and the learners have full control on the menu navigation, the events may not be done rigidly during the implementation stage. It should be assumed, that the instruction will be presented completely following the complete sequence of the events (see Figure 7) when the learners use the instruction for the first time. For subsequent uses, however, a certain phase may be skipped as it has been completed in the previous learning. As illustrated in Figure 8, after presenting the stimulus, assessing performance is initiated. The learners choose to follow this sequence because they believe that they are ready for the assessment after studying on the content for the second time.

Figure 7: Complete Events

Figure 8: Some events skipped

IV. CONCLUSIONS

Gagne's nine events of instruction can serve as a guidance in the process of designing computer-based listening material for students who prepare

themselves for a standardized test like TOEFL ITP. The suggested method in the implementation of the events is not to use the sequence of the nine events rigidly as this will not harness the full potentials of computer technology. Besides, this flexible placement of the event features in the user interface will enable the learners to use and reuse the material to suit their pace of learning and needs.

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