Visualization Guides in the Understanding of Theoretical Material in Lectures

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To cite this document:
DOI: https://doi.org/10.34306/ijcitsm.v3i1.124

Abstract

The aim of this study is to demonstrate how students’ comprehension is enhanced during the evaluation of a German language lecture through the use of visualization techniques. The research methodology utilized a descriptive quantitative approach and involved several tools such as video visualization, material exercises, questionnaires, and written documentation. Videos were used to assess language proficiency in various domains, including productive, receptive, and literary. The information presented through visualization utilized a combination of colors, varying word sizes, images, graphics, and audio. The study's findings indicate that students were able to comprehend approximately one-third of the subject matter due to the clarity and appeal of the visualizations. The inclusion of examples and instruction within the content contributed to a better understanding of the subject.

Keywords: Video, Materials of Visualisation, Visualization

1. Introduction

Based on lifestyle changes, thinking patterns, and influence, individuals are categorized into six generations, namely the Lost Generation, Greatest Generation, Silent Generation, Baby Boomers, Generation X, Generation Y, and Generation Z [1]. In Indonesia, the generation that is currently developing falls between generations X, Y, and Z. The education paradigm in the 21st century has changed, where the role of teachers is no longer just to impart knowledge, but rather to utilize innovative and adaptable learning materials with the aid of technology [2]. The German Language Education Study Program focuses on producing instructors with a full range of skills, including the ability to assess teaching methods. One of the courses offered is the German Language Teaching Evaluation course, which trains students to build assessment instruments and process results in the teaching and learning process of German. Lecturers use a variety of techniques in the learning process, but lectures tend to be more theoretical, and students avoid reading academic texts that are more theoretical in nature [3].

2. Research Method

In this study, the research method used is quantitative descriptive research, which aims to reveal the facts of an event, object, activity, process, and human being “as is” at the present time or a period of time that is still possible in the respondent's memory [4]. The population and sample used in this study are both composed entirely of the class of 2022’s A students. The data collection methods used in this study include focus group discussions, tests, and
questionnaires, and the data collected concern the usage of visualization in the German Language Teaching Evaluation course materials at State University [5]. The method of descriptive analysis used in this study involves item analysis of statements in the questionnaire regarding the caliber of the video and the comprehension of the subject matter, as well as test results and focus group discussion outcomes [6].

3. Findings

German Language Teaching Assessment lectures involve the submission of material utilizing graphical tools [7]. Receptive Language Competency Test material, Productive Language Competency, and Literary Competency Test are the three material themes that are visually displayed [8]. The visualization is provided as a video that has all visual components, including pictures, drawings, text, and audio. The visualization movie, which includes color-changing background, text, and image elements, is shown. Effects of zooming in, out, and pausing on any posts that are deemed important make the presentation more obvious [9]. This method of presenting is in keeping with Arsyad's theory that there are many different ways to visualize information that needs to be given to pupils, including images, illustrations, sketches, line drawings, graphs, charts, and combinations of two or more [10]. Two distinct videos cover the subject covered on the Receptive Language Competence Exam. Leseverstehen theme material includes an understanding of Leseverstehen, the principles of formulating questions of the Leseverstehen type, various discourse or written text types and their characteristics (Anzeige, Brief, and Zeitung), traits of text selection for formulating Leseverstehen questions, forms of Leseverstehen questions, an example of instructions on questions of the Leseverstehen type, and finally an example of an assessment of the Leseverstehen theme [11]. The information for the Hörverstehen theme then includes an understanding of Hörverstehen, guidelines for creating Hörverstehen-type questions, characteristics of various discourse or spoken text types (such as dialogue and narration), types of Hörverstehen questions, examples of guidelines for creating Hörverstehen type questions, and an example of an evaluation of the Hörverstehen theme. Two videos are used to present the material for the Productive Language Competency Exam[12].

The themes of the first and second videos are Mündlicher Ausdruck und Schriftlicher Ausdruck, respectively. The understanding of Mündlicher Ausdruck, the principles of creating Mündlicher Ausdruck type questions, examples of materials for creating Mündlicher Ausdruck questions and their characteristics, the types of Mündlicher Ausdruck questions, examples of instructions on creating Mündlicher Ausdruck type questions, and finally an example of the assessment of the Mündlicher Ausdruck theme test are all included in the Mündlicher Ausdruck theme material [13]. Then, for the Schriftlicher Ausdruck theme, the information includes an understanding of the term, guidelines for creating questions of the Schriftlicher Ausdruck type, examples of materials for creating questions of the Schriftlicher Ausdruck type and their characteristics, types of questions of the Schriftlicher Ausdruck type, examples of instructions on questions of the Schriftlicher Ausdruck type, and finally, an illustration of a test assessment using the Schriftlicher Ausdruck theme [14].

Then, for the Schriftlicher Ausdruck theme, the information includes an understanding of the term, guidelines for creating questions of the Schriftlicher Ausdruck type, examples of materials for creating questions of the Schriftlicher Ausdruck type and their characteristics, types of questions of the Schriftlicher Ausdruck type, examples of instructions on questions of the Schriftlicher Ausdruck type, and finally, an illustration of a test assessment using the Schriftlicher Ausdruck theme. A film provides impressions or a presentation of the content related to the Literary Competency Test's theme [15]. The video titled Literary Competency Test includes information on the characteristics of some literary works in the form of poetry, as well as examples of Competency Test assessment. It also includes examples of the kinds of questions that are typically used for Literary Competency Tests. When the film has been shown, data about the students' comprehension of the visualization material is gathered from the outcomes of any exercises or tasks they completed [16].

The majority of students were able to create questions on Sastra, Mündlicher Ausdruck,
Mündlicher Ausdruck, and Hörverstehen after analyzing the results of the question-making exercises [17]. It was demonstrated that regardless of the type of text or transcript, all students were capable of determining the structure of the questions. Some students still had not submitted the evaluation and answer key at the first meeting [18]. The quality of the student work improved from the following meeting until the last meeting, and it was clear that the criteria set forth in the questions had been expanded [19]. Students are already capable of making decisions on their own when it comes to creating literary topic questions. Students participated in the training process as a step of material consolidation and saw the material provided visualized [20]. The replies and opinions of the students can be used to determine whether video visualization of the content is practical. Study of the viability of displaying the subject material from the students’ questionnaire responses for the first Productive Language Proficiency Test. There are 15 statement items in the questionnaire [21]. Based on each indicator, the outcomes of the questionnaire data are described. The questionnaire's statement items are broken down into 4 categories: (1) play aspects in the visualization material, (2) text components in the material, (3) comprehension of the content, and (4) interest in the material [22].

### Table 1. Productive Language Ability

<table>
<thead>
<tr>
<th>No Item</th>
<th>Statement</th>
<th>STS</th>
<th>TS</th>
<th>S</th>
<th>SS</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>The visualization of the productive language ability test material is interesting</td>
<td>0</td>
<td>6</td>
<td>16</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>0%</td>
<td>23%</td>
<td>73%</td>
<td>4%</td>
</tr>
<tr>
<td>2</td>
<td>The visualization of the productive language ability test material is clear</td>
<td>1</td>
<td>5</td>
<td>13</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td></td>
<td>4%</td>
<td>28%</td>
<td>59%</td>
<td>9%</td>
</tr>
<tr>
<td>7</td>
<td>The sound (audio) on the video is clear</td>
<td>1</td>
<td>5</td>
<td>12</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td></td>
<td>4%</td>
<td>14%</td>
<td>54%</td>
<td>28%</td>
</tr>
<tr>
<td>8</td>
<td>The quality of the video displayed is good</td>
<td>0</td>
<td>3</td>
<td>12</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td></td>
<td>0%</td>
<td>23%</td>
<td>54%</td>
<td>23%</td>
</tr>
<tr>
<td>9</td>
<td>The composition of colors and images on dancing videos</td>
<td>0</td>
<td>4</td>
<td>13</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td></td>
<td>0%</td>
<td>23%</td>
<td>59%</td>
<td>18%</td>
</tr>
</tbody>
</table>

According to the chart above, 16 students (73%) thought the depiction of the information for the Productive Language Ability Test was fascinating. More than half (59%) of students said the visual representation of the content for the Productive Language Ability Test was understandable. Twelve pupils also made clear statements in the audio on the display component [23]. Also, up to 54% of students said that the video display's quality was good. The arrangement of colors and pictures in the film, in the opinion of 59% of the students, is appealing [24].

The perspectives of the students summarized during the Focus Group Discussion (FGD) procedure support the data results [25]. Here are some recommendations and remarks made by students during the FGD process: "The video's imagery is adequate. However, some of the processes leading up to the video's conclusion are not swift." (NMS) "Beautiful composition of colors." (CSP) There are certain sections that move too quickly. (LAA) The majority of the students stated that the visualization offered was good, but the pace of the procedure was still too quick, according to the results of the summary of the general opinion during the FGD process. These criticisms are taken into account when revising the display.
The findings of the examination of each statement item found in indicator (2) of the text elements in the visualization material based on Table 2 are described below. Up to 50% of students claimed that the writing on the video was illegible and difficult to read. Yet, according to 55% of college students, the language was common and understandable. The perspectives of the students summarized during the Focus Group Discussion (FGD) procedure support the data results. Here are some recommendations and remarks made by students during the FGD process: "The film is shorter and the typefaces have been modified to make it simpler to read. Many of the captions on the images are unclear, according to the UK. There are several texts that are obscure, and some of them are very brief in length. (SA) The majority of the students noted that the text in the video was still unclear since the size was too small and the speed was too rapid, according to the results of the summary of shared comments throughout the FGD process. These criticisms are taken into account when revising the display.

Table 3. Analysis of Each Statement

<table>
<thead>
<tr>
<th>No Butir</th>
<th>Pernyataan</th>
<th>STS</th>
<th>TS</th>
<th>S</th>
<th>SS</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>f  %</td>
<td>f  %</td>
<td>f  %</td>
<td>f  %</td>
</tr>
<tr>
<td>11</td>
<td>The examples given are clear</td>
<td>1  4%</td>
<td>4  18%</td>
<td>12  55%</td>
<td>5  23%</td>
</tr>
<tr>
<td>12</td>
<td>The flow of material is easy to understand</td>
<td>1  4%</td>
<td>5  23%</td>
<td>11  50%</td>
<td>5  23%</td>
</tr>
<tr>
<td>13</td>
<td>Exercise at the end of the video can be used as an understanding of the material</td>
<td>1  4%</td>
<td>3  14%</td>
<td>10  46%</td>
<td>8  36%</td>
</tr>
<tr>
<td>14</td>
<td>Exercises on clear understanding of the material</td>
<td>1  4%</td>
<td>3  14%</td>
<td>13  59%</td>
<td>5  23%</td>
</tr>
<tr>
<td>15</td>
<td>Exercises on understanding the material according to the video</td>
<td>1  4%</td>
<td>3  14%</td>
<td>12  54%</td>
<td>6  28%</td>
</tr>
</tbody>
</table>

As many as 55% of students indicated that the examples provided were clear, according to the analysis of each statement item contained in indicator (3) understanding of visualization material based on Table 3. 50% of students think the subject is presented in an easy-to-understand way. Also, 46% of students said that they could utilize the task at the end of the movie to demonstrate their comprehension of the subject. Up to 59% of students indicated that their comprehension of the subject was consistent with the film, which supported this.
Table 4. Indicator Understanding of Visualization

<table>
<thead>
<tr>
<th>No Butir</th>
<th>Pernyataan</th>
<th>STS</th>
<th>TS</th>
<th>S</th>
<th>SS</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>Visualization helps you understand the Receptive Language Proficiency Test material</td>
<td>0%</td>
<td>5 23%</td>
<td>16</td>
<td>73%</td>
</tr>
<tr>
<td>4</td>
<td>Visualization adds motivation to learn</td>
<td>1%</td>
<td>3 14%</td>
<td>13</td>
<td>59%</td>
</tr>
<tr>
<td>5</td>
<td>Productive language proficiency test video material supports you to study independently</td>
<td>1%</td>
<td>2 9%</td>
<td>16</td>
<td>73%</td>
</tr>
</tbody>
</table>

As many as 55% of students indicated that the examples provided were clear, according to the analysis of each statement item contained in indicator (3) understanding of visualization material based on Table 3. 50% of students think the subject is presented in an easy-to-understand way. Also, 46% of students said that they could utilize the task at the end of the movie to demonstrate their comprehension of the subject. Up to 59% of students indicated that their comprehension of the subject was consistent with the film, which supported this.

The examination of each statement item in indication (4) indicating student interest in material visualization, as shown in Table 4, reveals that 73% of students believe that visualization aids in understanding the material for the Productive Language Ability Test. Up to 59% of respondents claimed that visualizing considerably enhanced their motivation to learn. In addition, up to 73% of students can study independently with the use of the video study material for the productive language competence test. According to the survey’s findings, the majority of pupils showed a strong interest in the way the information was visualized. The total study’ findings demonstrate that the information has been visualized very effectively and interestingly. Some pupils already have a solid understanding of the information presented in the visualization.

The majority of pupils believe that the offered subject is interestingly visualized. This is due to the display’s enticing visual features, which include color variations, various writing styles on each display, moving visuals, graphics, and audio in the form of dialog and narration text recordings as well as accompaniment music. These findings concur with Howe & Nadler’s assertion that generation Y and generation Z are young people who are accustomed to visual styles and technological use, therefore the present generation will undoubtedly be exposed to these visual forms.

Because the presentation is in line with the requirements and interests of the current student body, interesting content can be delivered. The manufacturing, display, and construction of the visualization appearance all made use of technology. This is consistent with the National Education Standards Agency’s theory that the features of the 21st-century educational model include the use of educational technology, the strategic role of teachers/lecturers and students, innovative teaching and learning methods, contextual teaching materials, and individual-based independent curriculum structures. The color, acoustics, and material clarity in each visualization display’s presentation of the material theme garnered positive feedback. The color variations on each display’s background, images, and wording enhance the allure of the students. All respondents found the text components to be well written, with good clarity and readability. As a result, the presentation of the visualization is appropriate based on Smaldino’s principles of visual appearance design, which state that there are two fundamental components to visual design: text elements (font style), and visual elements (composition, balance, color, readability, and attractiveness). The visualization material, which is only 8 minutes long and is
shown twice, may also be understood quickly. Yet, the visualization appearance is presented in an appealing and understandable manner by fusing text, audio, and visual elements in the form of images and illustrations.

Zoom in, zoom out, and pause effects are available on the display of images and text to help make key points easier to remember. According to Pavio's Dual Coding Theory, learning will be simpler if verbal and visual cues are linked since, at their core, humans have two memory systems: verbal and nonverbal. The usage of material visualization is consistent with a number of expert perspectives, it may be inferred from the discussion's outcomes. Most students believe that using visualization can make the material on the topic of receptive, productive, and well-literate language proficiency examinations easier to learn. Displays of visualization that are consistent with the benefits of visualization as theorized by professionals help students comprehend the subject matter.

4. Conclusion

Students can use material visualization as a substitute for comprehending the information delivered in lectures during German language education evaluation. The comments and reactions from the course teacher and students show that the visual material presented during the research process was fairly good. The visual material presentation is presented using a combination of audio and visual elements, such as pictures and graphics. Many combinations of colors, fonts, and displays are used. Most students find the use of visualization with such a display to be appealing. These responses were expressed either through the Focus Group Discussion process or through questionnaire replies.

The outcomes of the work done throughout the practice process show that the usage of material visualization can also assist students understand the content properly. The majority of students are able to formulate good questions, according to practice results based on the material supplied in the form of visualization. Questions in the Receptive, Productive, and Literary Competence topics have been developed in a variety of formats and according to a number of criteria. The views and opinions shared by students through questionnaire analysis, in addition to the practice results, demonstrate good response outcomes that reflect their knowledge of the material visualizations presented on each material theme.

References


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