Multidiciplinary Output Research For Actual and International Issue (MORFAI Journal) ISSN (e): 2808-6635
Volumes 6 No. 1 (2026)

# DEVELOPMENT OF A PEOU-BASED BAKERY MODULE AND ACTUAL SYSTEM USEFOR STUDENTS WITH DISABILITIES AT SLB NEGERI 2 BANTUL

**Habibah Marie Curie[1]*, Endang Mulyatiningsih[2], Icha Fatwasauri[3].**
[1] Universitas Negeri Yogyakarta, Indonesia
[2] Universitas Negeri Yogyakarta, Indonesia
[3] Politeknik Negeri Indramayu, Indonesia,
E-mail: mariecurie.2023@student.uny.ac.id

| | | | |
|---|---|---|---|
| Received | : 20 September 2025 | Published | : 23 December 2025 |
| Revised | : 10 October 2025 | DOI | : https://doi.org/10.54443/morfai.v6i1.4699 |
| Accepted | : 13 November 2025 | Link Publish | : https://radjapublika.com/index.php/MORFAI/article/view/4699 |

**Abstract**

The purpose of this study is to improve the understanding and practical skills of PWD students. Learning at SLB Negeri 2 Bantul still focuses on direct presentation methods without the support of interactive modules that are easy to use and access by students. This condition creates a mismatch between the need of practical learning and the availability of media that suits the characteristics of PWD students. This study uses a Research and Development (R&D) approach using the ADDIE model (Analysis, Design, Development, Implementation, and Evaluation). Data were collected through observation, interviews, and questionnaires. The instrument used was a validated questionnaire by material experts and media experts. The results of the validity test for the feasibility of the material experts obtained a score of 89% with a very feasible category, while the media experts obtained a score of 98% with a very feasible category. The results of the effectiveness test on students obtained a t-test score of 21.0 which indicates that there is a significant difference in the use of the PEOU-based bakery practice module and the use of the actual system. Therefore, the developed module is proven to be effective in improving PWD students learning outcomes in the bakery practice material

***Keywords:learning media, bakery module, and disability***

## INTRODUCTION

Education is the right of every citizen, including people with disabilities (PWD). Quality education plays a crucial role in equipping each individual to survive, compete, and be independent in a dynamic and challenging life (Saputra Nanang Novi, 2020). PWD require special and specialized treatment (Chelsea Felki, David Newby, Joyce Cooper, Suzanne Nielsen, Angela Reeves, 2024). This is because PWD often face intellectual challenges, preventing them from fully participating in school due to limited abilities (Mahmood, 2022). Therefore, a special school for people with disabilities (PWD) called the Special Needs School (SLB) was established to provide special education. There are several types of PWD students, including those with high intelligence but substandard cognitive abilities, considered to have cognitive retardation. Deafness, a condition affecting the hearing organs, results in an inability to speak. Hearing impairment, a condition that causes speech impairments. Vocational skills are crucial for all students, including those with special needs. Acquiring vocational skills can be highly beneficial, particularly in increasing independence and self-confidence (Arifin Sahibul, WT, 2024). Furthermore, students with disabilities (PDD) are able to live independently without assistance because they possess independent skills (Jaya, 2018). Media is one of the tools needed to support skills activities. Media consists of various types based on the environment needed to create conditions for the recipient to obtain information (Aydin G, 2020). This relates to the fact that PWD students require special media in the form of modules to learn cooking. According to a study, PWD students can learn independently with the help of modules that include instructional videos and photos (Mahmood, 2022). This media can be used to support PWD interdisciplinary activities involving cooking skills (Idris, 2021). One of the modules designed, the bakery module for people with disabilities, aims to improve the knowledge, practical skills, and intellectual well-being of people with disabilities. This goal aligns with evaluations of WHO training manuals and community-based rehabilitation (CBR), which indicate that both are inadequate and require tools that can accommodate this population of people with disabilities (Raja K., Gupta S., Mathew J., 2020).

Students at SLB Negeri 2 Bantul face academic challenges. These challenges include limited media, particularly in culinary arts, as well as difficulties with reading and understanding instruction. In addition to academic challenges and inadequate facilities, the culinary arts class at SLB Negeri 2 Bantul uses teaching materials that only include a single worksheet (LKPD) addressing national learning objectives, competition requirements, and the principal's learning requirements. The LKPD lacks references to required practicums, particularly for practical work. This indicates that teachers lacked recipes or other references for conducting the practicum. Instead, they utilized recipe books, websites, and video tutorials. Students simply completed a worksheet based on the teacher's presentation of the material presented, based on the Student Worksheet (LKPD). This worksheet was simply a sheet of paper containing the recipe. Each student gradually imitated the teacher throughout the practicum because the teacher recognized that students' understanding of skills and reading was still weak.

Field findings also revealed that, despite the demonstration-based learning process, students at SLB Negeri 2 Bantul struggled to grasp the theory. Therefore, based on observations, students at SLB Negeri 2 Bantul require learning media that can serve as a guide for teachers and students, as the bakery module uses extensive visual images and contains some text. These learning media should be designed with the characteristics of students with disabilities in mind, who can understand instructions by viewing images. The selection of bakery materials in the developed learning media is influenced by several factors, including the product manufacturing process, which requires precise calculation of ingredients to produce quality products. This requires not only accurate measurements but also clear and precise guidance in processing techniques. Furthermore, it provides students at SLB Negeri 2 Bantul with new knowledge about bakery products and their processing techniques. The types of PWD that are the focus of this research include intellectual disabilities (intellectual barriers) and deafness (hearing barriers). Observations at SLB Negeri 2 Bantul showed a gap between needs and real conditions, namely that practical facilities were complete, but learning media were still limited to general LKPD, simple job sheets, and external references. Students had difficulty understanding theory and written instructions, so learning relied heavily on teacher demonstrations. The term deafness covers various levels of hearing loss, ranging from mild to severe, which is categorized as deaf (complete hearing loss or less with (still having residual hearing)) (Wasita Ahmad, 2012).

Deafness is not an emotional disorder, but their personality development is often influenced by self-perception and societal attitudes. Negative attitudes from individuals with normal hearing can make deaf children more emotionally vulnerable than children with hearing impairments (Wasita Ahmad, 2012). Based on the theory of information accessibility, deaf students have limitations in receiving audio-based information, so they need alternative, more visual information presentations (Marschark, M., & Spencer, 2010). Learning media in the form of images, illustrations, and visual symbols can function as compensation that strengthens conceptual understanding for students with hearing impairments. Mentally disabled refers to individuals with below-average intellectual abilities or mental retardation, which causes difficulties in participating in general education programs (Purwandari Ernisa, 2024). This condition is characterized by three main characteristics: limited intelligence, social limitations, and limitations in other mental functions. Limited intelligence is evident in difficulties in abstract learning such as reading, writing, and arithmetic, students tend to imitate without deep understanding. From a social perspective, children with mental disabilities have difficulty caring for themselves and interacting in society, are highly dependent on their parents, and require ongoing guidance. In addition, they also take longer to adapt to new situations and show better responses in consistent routines. According to Bruner's cognitive theory (1966), effective learning occurs through three stages: enactive (direct practice), iconic (images/visuals), and symbolic (text/abstract). For students with mental disabilities, the iconic stage is very important because the use of visual media can bridge understanding that is difficult to achieve through abstract text.

Previous research has shown that visual modules with simple illustrations can help PWD learn more independently (Mahmood, 2022). However, specific bakery modules based on visual images for PWD are still limited. Therefore, this study developed an adaptive visual-based bakery module based on the Technology Acceptance Model (TAM), which emphasizes perceived ease of use and perceived usefulness (Bitrian., 2023). In accordance with national education goals, every student, including those with disabilities, has the right to receive optimal learning services to foster independence. However, observations at SLB Negeri 2 Bantul revealed gaps, particularly in the availability of learning media. Ideally, culinary vocational skills need to be supported by adaptive visual modules with clear illustrations to enable PWD students to learn independently. In fact, the available media are still limited to general student worksheets (LKPD), simple worksheets, and difficult-to-understand external references. Although the culinary practice facilities are relatively complete, the learning process still relies on teacher demonstrations due to students' limited ability to understand text and instructions. This condition emphasizes the need to develop a visual-based bakery module that suits the characteristics of PWD and refers to the Technology

Acceptance Model (TAM), which emphasizes aspects of ease (perceived ease of use) and usefulness (perceived usefulness). This study was conducted to determine the design process, feasibility, and effectiveness of the bakery module for PWD students at SLB Negeri 2 Bantul regarding the use of bakery module learning media developed according to student characteristics. The results of this study are important to know because there has been no discussion or research on the implementation of bakery practicums for PWD conducted by researchers.

## METHOD

This type of research is research and development (R&D) using the ADDIE model (Analysis, Design, Development, Implementation, and Evaluation). This method was chosen because this research requires a concept in designing to produce a product that suits the needs of the problem. Data collection in this study was carried out from June to July 2025. The study aims to determine the feasibility and effectiveness of a bakery module for deaf and mentally retarded students by applying the use of visual images in the bakery module that focuses on skill and cognitive values in students. Activities carried out in the analysis stage identify student characteristics and needs, goals, and learning objectives in bakery development. This needs analysis is based on the adaptive national curriculum sourced from the 2022 Inclusive Implementation Guidelines. A needs analysis was produced in the form of student learning needs, media usage experiences, accessibility needs, and expectations for the media. The analysis stage activities were carried out through interviews with resource persons, Mrs. Hestiani Nurrohmah, the teacher in charge of culinary skills at SLB Negeri 2 Bantul. The design stage consists of three steps of activities: module framework planning, determining material references, and prototyping. The development stage aims to produce a final product in the bakery module with several steps including content creation containing the determination of the foreword, table of contents, student self-preparation instructions, introduction, material description, recipes, closing, glossary, and bibliography. The next step is module design which is considered in terms of the type of images used. The final step is product validation carried out by learning media experts and bakery material experts, validation is carried out to obtain the feasibility of the material and graphics of the bakery module. The next stage is (implementation) implementation is an activity to test the effectiveness of the bakery module on users, namely students of SLB Negeri 2 Bantul at junior and senior high school levels, totaling 5 students in phase F. The final stage is (evaluation) evaluation is carried out through two types of assessments, namely formative evaluation to assess the feasibility of the module and summative evaluation to assess the effectiveness of its use. Evaluation data is analyzed to identify deficiencies, which are presented in the form of questionnaires and written input from respondents.

The primary data sources in this study were obtained by the researcher through interviews with informants, observations, and questionnaires. Meanwhile, secondary data were obtained from scientific journals, books, research documentation, and researcher notes. The data collection stages were carried out using participatory observation techniques where the researcher was involved in practical activities using the bakery module to observe and understand behavior, interactions, and conditions in more depth from the perspective of the research subjects. The second data collection technique used was a semi-structured interview adapted to the interview guide for the informants, namely teachers at SLB Negeri 2 Bantul who used the PEOU-based bakery module and actual system use, a teacher in charge of the culinary skills class. The third data collection technique used by the researcher was the use of a questionnaire conducted by giving written questions and statements to respondents. The questionnaire was used to determine the feasibility of the module and the effectiveness of the PEOU-based bakery module and actual system use. The instruments used by the researchers were divided into three types, namely material expert instruments, media expert instruments, and interview instruments. The material expert instrument contained the suitability of the module based on actual system use which was assessed in the aspects of curriculum and learning outcomes, materials, language, and media selection. The media expert instrument contained the suitability of the module based on PEOU which was assessed in the aspects of module size, module cover design, and module content design. Meanwhile, the interview instrument was conducted to fulfill the needs analysis data with indicators of identifying learning needs, knowing the experience of using media/modules, knowing accessibility needs, and knowing expectations of the module. The data analysis stages used by the researcher were carried out by calculating the average score of the learning media's feasibility. Raw numerical data were then analyzed qualitatively using a scoring system (Azwar Saifuddin, 2012). Qualitative data were generated from the feasibility percentage formula by converting the average to a percentage. The effectiveness of the learning media was carried out by analyzing pre-test and post-test data. The pre-test was obtained from students' report cards before using the bakery module, while the pre-test was obtained from students' practicum results after using the bakery module. The assessment was carried out by the teacher in charge of culinary skills. However, during the practicum implementation process, the researcher

accompanied PWD students in using the bakery module. Pre-test and post-test scores were determined using n-gain calculations. There was a calculation of discriminatory power using a t-test. The study only involved one experimental group, so the analysis technique used was a paired sample t-test.

## RESULTS AND DISCUSSION

### 1. Research Subject Profile

After conducting an assessment through observation, interviews, and documentation studies, a profile of PWD students was produced. This assessment aims to determine the abilities, potential, and weaknesses of PWD students with intellectual disabilities and hearing impairments during their bakery practicum.

**Table 1. Analysis of Characteristics of PWD Students**

| Student Name | Ability | Potential | Lack | Types of Disabilities |
|---|---|---|---|---|
| Dellanda Chanayanti | a. Able to name cooking ingredients<br>b. Able to identify the names of cooking utensils<br>c. Able to identify processing techniques | a. Able to practice making dishes if drilled many times<br>b. Memorizing power is better than other friends | a. Lack of confidence during learning and need to be stimulated first<br>b. Very dependent on his friends<br>c. Not yet able to practice the exercise techniques independently<br>d. Creativity is lacking, especially during practical learning.<br>e. It is difficult to understand the material presented by the teacher. | Students with intellectual disabilities, grade XI |
| Halilah Bilqis Aulia | a. Able to name several cooking ingredients<br>b. Able to identify the names of cooking utensils<br>c. Able to identify several processing techniques | a. Able to practice making dishes if drilled many times<br>b. Have confidence when practicing even though sometimes you make mistakes | a. Less able to maintain personal hygiene whenpractice<br>b. Sometimes don't want to ask even though you don't know<br>c. Creativity is lacking, especially during practical learning.<br>d. It is difficult to understand the material presented by the teacher. | Students with intellectual disabilities, grade XI |
| Najwa Khairani Dewi | a. Able to name cooking ingredients<br>b. Able to identify the names of cooking utensils<br>c. Able to identify processing techniques | a. Easycatchmaterial delivered by the teacher. Demonstrated once and guided practice once, students are able topracticeAlone.<br>b. Actively ask questions if you | a. A bit moody, easily distracted while studying (often chats with friends) | Students with hearing impairments, grade X |

| Student Name | Ability | Potential | Lack | Types of Disabilities |
|---|---|---|---|---|
| | | don't know or don't understand.<br>c. Have your own creativity, especially when decorating dishes | | |
| Nurika Safitri | a. Able to name cooking ingredients<br>b. Able to identify the names of cooking utensils<br>c. Able to identify processing techniques<br>d. Capablepracticeseveral processing techniques | a. It's quite easycatchmaterial delivered by the teacher. Demonstrated once and guided practice three times, students are able topracticeAlone. | a. Creativity is quite good, but there's no initiative to explore. They simply follow the teacher's example. | Students with hearing impairments, grade X |
| Nabila Zalfa | a. Able to name cooking ingredients<br>b. Able to identify the names of cooking utensils<br>c. Able to identify processing techniques | a. Easycatchmaterial delivered by the teacher. Demonstrated once and guided practice once, students are able topracticeAlone. | a. Often absent from school for various reasons, even though the student is quite smart. | Students with hearing impairments, grade X |

**2. Bakery Module Development**

The module developed in this study is a bakery module. This subject was chosen for several reasons, including the need for precision in calculating ingredients and skills in processing techniques to produce quality products. Another reason is to provide PWD students at SLB Negeri 2 Bantul with new knowledge about bakery products and their processing techniques.

The bakery module was designed using the Canva app. Canva was chosen for its user-friendliness, including the ability to select module designs, find image sources, and easily rearrange layouts. The resulting bakery module consists of several sections: an introduction, body, and conclusion. Here are the steps in creating a bakery module:

a. Curriculum Analysis
The curriculum analysis was conducted based on the learning outcomes for making bakery dishes in Phase F and the 2022 Inclusive Implementation Guidelines for students with intellectual disabilities and hearing impairments. This curriculum analysis was used as a reference by the researcher in developing the bakery module material. The final results were then approved by the teacher in charge of culinary skills.

b. Collecting supporting materials and content
The description of the material included in the bakery module includes, among others, the general definition and explanation of pizza, criteria for pizza product results, causes of pizza failure, types of tools used in pizza, types of ingredients used in pizza, and the pizza making process. The content or images used in the bakery module are taken from researcher documentation, free photo provider websites with source mention, as well as including video sources from YouTube in the bakery module.

c. Prototype
At this stage, the researcher already has an initial product (prototype) or product design. The product design contains the practical materials and the design for the bakery module. The purpose of this prototype is to facilitate the layout and content design process and to ensure that no content or material is left out for inclusion in the bakery module.

d. Writing and designing bakery modules based on PEOU and actual system use
The written content is adjusted to the prototype that has been prepared. The researcher designed the sequence of presentation of the material such as the cover, foreword, table of contents, instructions for student self-preparation, introduction (background, scope, and learning objectives), description of pizza material, criteria

for pizza product results, causes of pizza failure, list of tools, list of ingredients, pizza making process, glossary, and bibliography. The following are the design results from the development of the PEOU-based bakery module and actual system use.

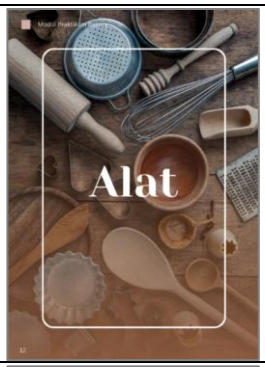
1) Opening section

**Table 2. Opening Section of Module Development**

| No. | Name | Picture | Information |
|---|---|---|---|
| 1. | *Cover*front |  | *Cover*The front includes the title, bakery image, logo, institution, and author's name. |
| 2. | Foreword |  | Contains an explanation of the function of the module in learning activities and conveys appreciation to all parties who have contributed to the preparation of the bakery module so that it can be implemented well. |
| 3. | List of contents |  | The table of contents contains the pages for each component in the module. |
| 4. | Student self-preparation instructions |  | The student self-preparation instructions contain information about what attributes each student must wear. |

2) Contents Section

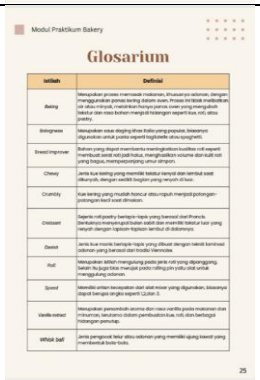
**Table 3. Module Development Content Section**

| No. | Name | Picture | Information |
|---|---|---|---|
| 5. | *Cover*each chapter |  | In the bakery module there are cover dividers for each component of the module contents. |
| 6. | Introduction |  | The introduction contains:<br>a. Background<br>In general, it contains bakery modules developed as a learning media guide.<br><br>b. Scope<br>Loading the target users, namely culinary arts vocational students at SLB N 2 Bantul, and the type of material in the bakery module.<br><br>c. Learning objectives<br>Contains the hope that a learning outcome will be achieved. |
| 7. | Fill in the material |  <br>  | This section contains practical material that will be studied by PWD students. |

| No. | Name | Picture | Information |
|---|---|---|---|
| | |     | |

3) Cover section

**Table 4. Closing section of module development**

| No. | Name | Picture | Information |
|---|---|---|---|
| 8. | Evaluation |   | Contains an assessment format filled out by the teacher based on several assessment aspects. |
| 9. | Glossary |   | Contains an explanation of the meaning of each Latin term in the bakery module, arranged alphabetically. |
| 10. | bibliography |   | This is a list of references used as a source of information for developing bakery modules. |
| 11. | *Cover*behind |  | *Cover*the back contains the institution's logo. |

### 3. Feasibility and Effectiveness Test

To determine whether the PEOU-based bakery module and actual system use are feasible and effective, a feasibility test is needed on material and media experts and an activity test is needed on mentally retarded and deaf students at SLB Negeri 2 Bantul. The results of the trials in this study are as follows.

a. Feasibility test results

1) Subject matter expert

**Table 4. Results of the Material Expert Feasibility Test**

| No. | Aspect | Indicator | Assessment Score | |
|---|---|---|---|---|
| | | | *Validator*1 | *Validator*2 |
| 1 | Curriculum and Learning Outcomes | | | |
| | a. Curriculum and Learning Outcomes | 1) Learning media is in accordance with the curriculum | 4 | 4 |
| | | 2) Learning media has supported digitalization in learning | 4 | 5 |
| | | 3) Learning media is in accordance with Learning Outcomes | 4 | 5 |
| | | 4) The learning media is in accordance with the learning objectives | 5 | 4 |
| | b. Accuracy of Material | 5) The truth of the material in the scientific field | 5 | 4 |
| 2 | Material | | | |
| | a. Pizza | 6) Clarity about the meaning of pizza | 5 | 4 |
| | | 7) Clarity on the reasons for the pizza failure | 4 | 5 |
| | | 8) Clarity about pizza criteria in terms of taste, texture and appearance | 4 | 4 |
| | b. Pepperoni Pizza | 9) Clarity of the meaning of pepperoni pizza | 5 | 4 |
| | | 10) Clarity of ingredients for making pepperoni pizza | 5 | 4 |
| | | 11) Clarity of pepperoni pizza making tools | 5 | 4 |
| | | 12) The clarity of the pepperoni pizza making process | 4 | 4 |
| | | 13) Pepperoni pizza recipe clarity | 5 | 4 |
| | | 14) Clarity of pepperoni pizza presentation | 4 | 4 |
| | c. Evaluation | 15) Suitability of pizza assessment criteria to the material | 4 | 4 |
| | | 16) Suitability of material in practice questions | 4 | 4 |
| | | 17) Clarity of assessment in practice questions | 4 | 4 |
| | | 18) Level of difficulty of practice questions | 4 | 4 |
| 3 | Language | | | |

| No. | Aspect | Indicator | Assessment Score | |
|---|---|---|---|---|
| | | | *Validator*1 | *Validator*2 |
| | a. Material | 19) The terms and language in the media are easy to understand and appropriate to the material. | 5 | 4 |
| | | 20) Information in learning media is easy to understand | 5 | 4 |
| 4 | Media Selection | | | |
| | a. Display | 21) Clarity of media presentation | 4 | 4 |
| | | 22) Learning media can be interesting*focus*student attention | 4 | 5 |
| | b. Target | 23) Learning media can handle the diversity of students in learning | 5 | 5 |
| | c. Ease of access | 24) Learning media can be used flexibly | 5 | 4 |
| | | 25) Use of space and time efficient media | 4 | 5 |
| | d. Use | 26) Learning media is easy to obtain and practical | 4 | 4 |
| | | 27) Learning media can increase student motivation | 4 | 5 |
| | e. Interactive | 28) Learning media encourages two-way communication | 5 | 4 |
| | | 29) Students can participate actively in the use of media | 5 | 4 |
| | | 30) Learning media facilitates interaction | 5 | 4 |
| | Total score | | 138 | 128 |
| | Average assessor score | | 266 | |
| | Eligibility percentage | | 89% | |
| | Category | | Very Worthy | |

Based on the feasibility results, material expert 1 obtained a total score of 138 and material expert 2 128, with a total of 266. After calculating the average, the feasibility percentage was 89%. Based on the feasibility percentage category, this value is included in the very feasible category for the learning material aspect.

2) Media expert

**Table 5. Results of the Media Expert Feasibility Test**

| No. | Aspect | Indicator | Assessment Score | |
|---|---|---|---|---|
| | | | *Validator*1 | *Validator*2 |
| 1. | Module Size | 1) Module size conforms to ISO A4 standard (210 X 297 mm). | 5 | 5 |
| 2. | Module Skin Design (cover) | 2) The appearance of the layout elements on the front and back covers harmoniously has rhythm and unity and is consistent. | 5 | 5 |
| | | The letters used are attractive and easy to read | | |
| | | 3) The font size of the module title is more dominant and proportional compared to the size of the book and the author's name. | 5 | 4 |
| | | 4) Don't use too many font combinations. | 5 | 5 |
| | | Module cover illustration | | |
| | | 5) Describes the contents of the practical material and reveals the character of the object. | 5 | 4 |
| 3. | Module content design | Harmonious layout size | | |
| | | 6) Proportional print area and margins | 5 | 4 |
| | | 7) The margins of two adjacent pages are proportional | 5 | 4 |
| | | 8) The spacing between text and illustrations is appropriate | 5 | 5 |
| | | Full layout size | | |
| | | 9) Chapter title, chapter subtitle, and page number | 5 | 5 |
| | | 10) Illustrations and image captions | 4 | 5 |
| | | Simple module content typography | | |
| | | 11) Don't use too many fonts. | 5 | 5 |
| | | 12) Do not overdo the use of letter variations (bold, | 5 | 5 |

| No. | Aspect | Indicator | Assessment Score | |
|---|---|---|---|---|
| | | | *Validator*1 | *Validator*2 |
| | | italic, all capital, small capital). | | |
| | | Easy to read typography | | |
| | | 13) The font type is appropriate to the content. | 5 | 4 |
| | | 14) Normal text layout width. | 5 | 4 |
| | | 15) The spacing between lines of normal text arrangement. | 5 | 4 |
| | | Illustration of contents | | |
| | | 16) Able to express meaning and images. | 5 | 5 |
| Total score | | | 79 | 78 |
| Average assessor score | | | 157 | |
| Eligibility percentage | | | 98% | |
| Category | | | Very Worthy | |

Based on the data in Table 10, media expert 1 obtained a total score of 79 and media expert 2 78, for a total of 157. After being converted into a feasibility percentage, the score obtained was 98%. Based on the feasibility percentage category, these results indicate that the learning media is very suitable for use.

b. Effectiveness test results

The effectiveness test results were obtained from students' report card scores before using the bakery module as pre-test data, while the post-test data were generated from practical learning using the bakery module. The effectiveness test results are as follows.

**Table 6. Effectiveness Test Results**

| Student Name | *Pre-test* | *Post test* | N-gain | $d_i$ | $(d_i - \bar{d})^2$ |
|---|---|---|---|---|---|
| Echa (Intellectual Barriers) | 78 | 82 | 0.2 | 4 | 0.04 |
| Bilqis (Intellectual Barriers) | 78 | 82 | 0.2 | 4 | 0.04 |
| Nurika (Hearing Impairment) | 85 | 90 | 0.3 | 5 | 0.64 |
| Rani (Hearing Impairment) | 88 | 92 | 0.3 | 4 | 0.04 |
| Sania (Hearing Impairment) | 80 | 84 | 0.2 | 4 | 0.04 |
| Average | | | | 4.2 | 0.80 |

Based on the table above, the sample variance and standard deviation values are as follows:
Sample variants:

$$S_d^2 = \frac{\Sigma(d_i - \bar{d})^2}{n-1} = \frac{0{,}80}{5-1} = \frac{0{,}80}{4} = 0{,}20$$

Standard deviation:
$S_d = \sqrt{0{,}20} = 0.4472$
So the paired sample t-test values are obtained as follows:

$$t = \frac{\bar{d}}{S_d/\sqrt{n}}$$

$$t = \frac{4,2}{\frac{0,4472}{2,23}} = 21,0$$

Based on the calculation results in the table above, the normalized n-gain is set at 0.3 < g < 0.7, which is included in the moderate criteria, where the results obtained from each value are not less than 0.3 and not more than 0.7. Therefore, it can be concluded that there is an indication of increased learning outcomes by using the bakery module developed with moderate criteria. The results of the paired sample t-test calculation obtained t count = 21 with degrees of freedom (df) of 4. This value was then compared with the t table.= 2.776 at a significance level of 5% (α=0.05). Because the calculated t is much larger than the ttable(21 > 2.776) then the decision taken is to reject hypothesis 0 (H0) and accept the alternative hypothesis (Ha). This shows that there is a significant difference between students' pretest and posttest scores after using the bakery module. In other words, the bakery module developed has proven effective in improving student learning outcomes in bakery practice material.

**Discussion**

One form of technological innovation in increasing learning effectiveness is the development of learning media, which plays an important role in supporting the success of the teaching process (Febblina Daryanes. A., 2023). It can be concluded that the development of PEOU-based bakery modules and actual system use is carried out in accordance with the guidelines and needs of students in the learning process, and the results of the study are in line with (Anggraeni Dyah Rosita, 2019), IKK students in the bakery course still lack learning media. One form of innovation that can be utilized is a module (Kurniawan Andri., 2021) this media is able to provide a more optimal learning experience for students with special needs.

The theory proposed by Robert M. Gagne states that learning is the result of the transformation of external stimuli (Ragan, TJ, & Smith, 2020). One external factor that influences the student learning process and can be controlled is learning media (Sawaliya, 2022). The goal of developing TAM is to meet media quality standards and maximize media potential (Soetam Rizky Wicaksono, 2023). This is in line with research showing that actual system use influences perceptions of user friendliness, including aspects of features, visual appearance, and instructions for using the media (Debajyoti Pal., 2020). This statement is in line with research which states that the development of module media can be adapted to individual needs, characteristics, and diverse learning contexts (Garcia Juan. AM, 2024) this can increase student learning motivation, and this finding is also supported by other research (Sofyanto Salam. S, 2025) which states that the application of innovative media can significantly improve student learning outcomes.

## CONCLUSION

This study developed a bakery module based on PEOU and actual system use on pizza products with the ADDIE model through five stages: analysis, design, development, implementation, and evaluation. The analysis was conducted at SLB Negeri 2 Bantul to adjust to student characteristics and learning media needs. The validation results showed very high feasibility with a score of 89% by material experts and 98% by media experts. The effectiveness test produced t count = 21 > t table = 2.776 indicating a significant increase between pre-test and post-test scores. Thus, the bakery module based on PEOU and actual system use is feasible and effective for use in practical learning for PWD students with intellectual disabilities and hearing impairments.

## REFERENCES

Anggraeni Dyah Rosita, et al. (2019). Development of a fuzzy learning module in the intelligent systems course for undergraduate students of Electrical Engineering Education, State University of Malang. Journal of Technology, Electrical, and Vocational Studies, 29(1), 26–40.

Arifin Sahibul. WT (2024). Development of a Digital Screen Printing Learning Module to Improve Vocational Skills of Students with Special Needs in Special Needs Schools. Yogyakarta State University.

Aydin G. (2020). The effects of guided inquiry-based learning implementations on 4th grade students and elementary teachers; a case study. İlköğretim Online (Electronic), 19(3), 115–1184. https://doi.org/:10.17051/ilkonline.2020.727298

Azwar Saifuddin. (2012). RELIABILITY and VALIDITY.

Bitrian., et al. (2023). The Use of Gamification Strategies to Enhance Employees' Attitudes Towards E-Training Systems. International Journal of Management in Education, 21(3).

Chelsea Felki., David Newby., Joyce Cooper., Suzanne Nielsen., Angela Reeves., HC (2024). Medication management issues perceived by pharmacists and disability caregivers while supporting people with disabilities. Journal Exploratory Research in Clinical and Social Pharmancy, 15. https://doi.org/https://doi.org/10.1016/j.rcsop.2024.100489

Debajyoti Pal., VV (2020). Perceived usability evaluation of Microsoft Teams as an online learning platform during COVID-19 using system usability scale and technology acceptance model in India. Journal Children and Youth Services Review. https://doi.org/https://doi.org/10.1016/j.childyouth.2020.105535

Febblina Daryanes. A., et al. (2023). The development of articulate storyline interactive learning media based on case methods to train students' problem-solving abilities. Heliyon Journal, 9.

Garcia Juan. AM, et al. (2024). Applying the technology acceptance model to online self-learning: A multigroup analysis. Journal of Innovation & Knowledge. https://doi.org/https://doi.org/10.1016/j.jik.2024.100571

Idris. (2021). Community Based Rehabilitation Solution for Global Problems in Improving Quality of Disabilities. Deeper Learning Research Series. https://files.eric.ed.gov/fulltext/ED560790.pdf

Jaya., et al. (2018). Life Skills Education for Children with Special Needs in order to Facilitate Vocational Skills. Journal of Physics: Conference Series, 1028(1). https://doi.org/https://doi.org/10.1088/1742-6596/1028/1/012078

Kurniawan Andri., et al. (2021). DEVELOPMENT OF INTERACTIVE DIGITAL MODULE MEDIA FOR INCLUSION-BASED BRAILLE LEARNING TO IMPROVE STUDENT LEARNING OUTCOMES. Journal of Inclusive Education, 5(1), 6–12. https://doi.org/https://doi.org/10.26740/inklusi.v5n1.p006-012

Mahmood, et al. (2022). Development of people with disabilities (PWD)-friendly module for bakery production. Food Research Journal, 6(2). https://doi.org/10.26656/fr.2017.6(2).190

Marschark, M., & Spencer, P. E. (2010). The Oxford handbook of deaf studies, language, and education. Oxford University Press, 2.

Purwandari Ernisa. (2024). Social Skills of Early Childhood Students with Intellectual Disabilities in Inclusive Schools. Edukatif: Journal of Educational Sciences, 6(4), 2906–2915. https://doi.org/https://doi.org/10.31004/edukatif.v6i4.7004

Ragan, T. J., & Smith, P. L. (2020). Conditions Theory And Models For Designing Instruction. Handbook Of Research On Educational Communications And Technology.

Raja K., Gupta S., Mathew J., and R.P. (2020). Development of training manuals for community disability workers. Journal of Physiotherapy, 14(1), 37–40. https://doi.org/https://doi.org/10.4103/PJIAP.PJIAP_19_19

Saputra Nanang Novi. (2020). Development of a Water Introduction Game Model to Improve Aquatic Material Learning Outcomes for Grade III Mentally Disabled Children. Yogyakarta State University.

Sawaliya, Y. (2022). Study of Vocational Education and Employment Competence. Yasin, 2(4), 615–633. https://doi.org/Https://Doi.Org/10.58578/Yasin.V2i4.524

Soetam Rizky Wicaksono. (2023). Basic Theory of Technology Acceptance Model. ResearchGate.

Sofyanto Salam. S. (2025). JOBSHEET DEVELOPMENT IN IMPROVING STUDENTS' COMPETENCIES IN BASIC CULINARY LEARNING OUTCOMES FOR GRADE X STUDENTS OF CULINARY COMPETENCIES OF SMK N 6 KOTA SEMARANG. Semarang State University.

Wasita Ahmad. (2012). The Ins and Outs of Deafness and Muteness and Their Learning Strategies. Javalitera.