Development of p-Book and e-Book Based Modules in Batik Creation in Fine Arts Department

Sugito, Wahyu Tri Atmojo, Misgiya, Adek Cerah Kurnia Azis[*]
Fine Arts Education Study Programme, Faculty of Language and Arts,
Universitas Negeri Medan
*Corresponding Author. Email: adekcerah@unimed.ac.id

Abstract: This study aims to develop p-book and e-book-based modules that are valid, practical, and effective in the Archipelago Ornament Course and the Batik Craft Course in the Fine Arts Department. This research method used research and development with the 4-D development model (Four-D Models), namely: define, design, develop, and disseminate. The research instrument used a questionnaire with a Likert scale, while the data analysis technique consisted of validity data analysis, practicality data analysis, and effectiveness test data analysis. The results of this study indicated that: a) the validity value of the module was 79.25%, and the module was a pretty valid category; b) the value of the practicality of the module by students was 85.33%, and the module was included in the practical category in the learning process, and c) the average value of student activity (reading modules, asking questions, answering questions, and completing assignments) observed in the learning process and student learning outcomes was 82.81% which can be category as very active students and modules were category as effective. It showed that p-book and e-book-based modules were quite valid, practical, and effective in the learning process in the Archipelago Ornament Course and the Batik Craft Course in the Fine Arts Department, Faculty of Languages and Arts, Universitas Negeri Medan.

Introduction

Batik is one of the crafts among several crafts contained in craft activities in Indonesia. Batik is a noble cultural heritage of the Indonesian people that has existed for a long time and has developed and grown to this day (Wulandari, 2022). Batik has almost reached more than a decade of being named an intangible cultural heritage of Indonesia precisely on 30 September 2019 (Widadi, 2019), this long period provides an opportunity for batik artists to be able to develop creativity in creating batik designs. Many things can be used as a source of inspiration in making new batik motif designs, such as plants, animals, natural objects, and even mythological creatures that may be believed by the local community (Aryani et al., 2020).

The creation of batik is carried out with designs and motifs that are very diverse in depth (Girsang, 2021), carried out with different techniques and materials to innovatively develop the existence of batik in Indonesia. In the Department of Fine Arts, Faculty of Language and Arts, Universitas Negeri Medan, batik is one of the curricula taught for a long time under Batik Craft Course and Archipelago Ornament Course. These two courses are correlated with one another; where before taking Batik Craft Course, students first take the Ornaments of the Archipelago Course, students can continue to Batik Craft Course after

passing the Ornaments of the Archipelago Course because Ornaments of the Archipelago Course contains material about batik design knowledge. The purpose of organising the learning Batik Craft and Archipelago Ornament Course is to develop the art of batik culture, accommodate students' interests and talents in Batik Craft, preserve Archipelago Ornament through Batik Craft, a vehicle for expression, students develop abilities and skills in traditional art through Batik Craft and Archipelago Ornament media.

Along with the above objectives, in terms of mastery of knowledge of techniques, materials, and the process of creating Kriya Batik, the average student has no doubt about his ability. Many Batik Craft works have been produced with very good quality, have been exhibited in many national exhibitions and collected by various groups into the archipelago batik collection. In addition to the excellent ability of students, there are things that need to be taken more seriously, namely the development of the form of batik design, which requires a wider range of batik design modifications. The batik works created are no longer limited to displaying only one form of ornament that appears independent as the original ornament form, but there needs to be a modification of a newer form of batik design.

Along with the above objectives, in terms of mastery of knowledge of techniques, materials, and creating Kriya Batik, the average student does not doubt his ability. Many Batik Craftworks have been produced with very good quality, exhibited in many national exhibitions, and collected by various groups into the archipelago batik collection. In addition to the excellent ability of students, some things need to be taken more seriously, namely the development of the form of batik design, which requires a broader range of batik design modifications. The batik works created are no longer limited to displaying only one form of ornament that appears independent of the original ornament form. However, there needs to be a modification of a newer form of batik design.

Judging from this condition, based on the observations of researchers during lectures in July-December 2022 and January-June 2023 on the results and grades of students' batik design assignments, the average student's ability is still in the sufficient and good categories, of course, needs to be re-evaluated to improve students' batik design skills to enter the excellent category. Through evaluation, it will also provide an overview and useful information for assessing various alternatives in decision-making (Lubis, 2022). So to hone the creativity of students who master the techniques, knowledge of materials, and the process of creating batik, it is necessary to hone their more profound abilities in developing or modifying batik motif designs. It needs to be done by creating a module based on p-books and e-books to provide knowledge, skills, and examples of batik design modifications so that new ideas emerge that are more creative than before. Modules based on p-books and e-books are easily accessible and available on student desktops and Android phones (Farid et al., 2021), especially now that electronic technology is a normative part of everyday life (Reich et al., 2019).

Further development creates batik designs by modifying the shape of ethnic ornamental motifs without leaving the original form, often also called shape distortion. Shape distortion is a designer's ability to process the shape of an object by making changes or shifts in form without losing the original form of the form or shape that is changed (Afsiser, 2021). Many things can be done to modify a design, from a form developed from the renewal of an old design to a contemporary design. The development of batik motif design that is carried out affects increasing the number of newer batik motif images (Wicaksono et al., 2017), So that new batik motif designs will emerge that are interesting and unique. New motifs appear because they are done by changing the original style into a form of decoration with a more exotic appearance. Based on the explanation above, this research aims to develop p-book and

e-book-based modules that are valid, practical, and effective in the Archipelago Ornament and Batik Craft courses in the Fine Arts Department.

Research Method

This research method used research and development with the 4-D model (Four D Models), which has 4 stages, namely: define, design, develop, and disseminate (Thiagarajan, 1974) as quoted in (Sugiyono, 2016). The research location was in the Department of Fine Arts, Faculty of Language and Arts, Universitas Negeri Medan. The research subjects were 6th and 7th semester Fine Arts students who had taken Archipelago Ornament Course and Batik Craft Course. The research was conducted in the even semester of the academic year 2022/2023 and the odd semester of the academic year 2023/2024. The research population was all Fine Arts students who have taken Archipelago Ornament and Batik Craft courses, where sampling uses random sampling techniques. Since there was a large population, in order to simplify the population and speed up the time, a sample of 10% was taken.

Table 1. Population and Sample

No	Class	Population	Sample (10%)
1	A	25 persons	2.5 = 3 persons
2	B	25 persons	2.5 = 3 persons
3	C	25 persons	2.5 = 3 persons
4	D	25 persons	2.7 = 3 persons
	Total	102 persons	12 persons

This research instrument used a questionnaire with a Likert scale with data analysis techniques consisting of data analysis: validity, practicality, and effectiveness tests. Determining media validation using a Likert scale and analyzing the module's practicality level refers to the questionnaire given to students. The questionnaire was compiled in the form of a Likert scale. Effectiveness is determined based on the analysis of student learning outcomes on cognitive aspects. Determining the completeness of student learning outcomes can be calculated using the following equation:

$$KB = \frac{T}{Tt} \, x \, 100 \quad \%$$

Description:
LC = Learning Completeness/ KB
C = Completed/ T
TC = Total Score/ Tt

Each student is said to be a complete learner if the comparison of correct answers 65%, and a class is said to be a complete learner if in the class there are 85% of students pass (Depdiknas 1996) (in, Setyawan & Purwanto, 2019). The module is practical if the student learning outcomes have met the standards if 85% of students have completed it. This research has a flow as listed in Figure 1.
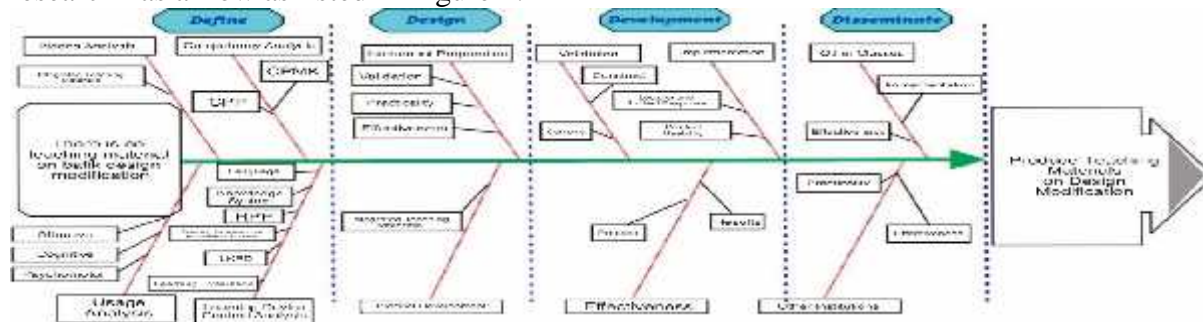

Figure 1. Flow of Module Development in the Form of p-Books and e-Books

Results and Discussion
Define Phases

The defining stage was done through curriculum, concept, and student analysis. Curriculum analysis aims to analyze the SK and KD in the introductory Archipelago Ornament and Batik Craft courses. Concept analysis aims for basic concepts students must understand during the learning process. Compiling a concept analysis contains the formulation of the main concepts to be compiled in the module on p-book and e-book-based materials. Meanwhile, student analysis aims to find out the characteristics of students. That is because each student has characteristics that are different according to their characteristics (Kasman & Lubis, 2022). The characteristics of students are age, learning motivation, cognitive background, and student academic competence.

Design Phase

The cover is designed to be as attractive as possible to invite student response and interest in learning the module's contents (Azis et al., 2021). The color combination of the cover is adjusted to the color of the media image and the content in the module. Park et al. (2023). It is also argued that the attractiveness of an image on a book cover positively influences pleasure and increases the book's value. The module cover design can be observed in Figure 2.
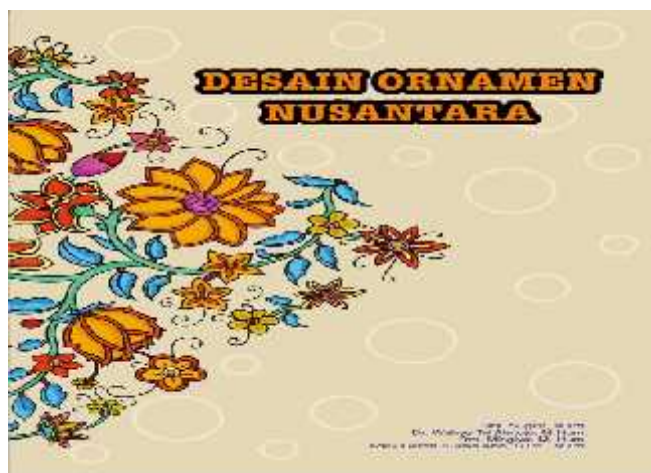

Figure 2. Module Cover View

Develop Phase

The development stage includes expert validation and pilot testing of p-book and e-book-based modules to obtain the developed modules' validity, practicability, and effectivity. After the module was prepared, it was validated by two validators. The first validator was a design expert, and the second validator was a linguist. At the same time, students tried the practicality assessment. If the module can improve students' comprehension of the material already developed, then the module is said to be practical. The module's effectiveness was evaluated by conducting tests to see the learning outcomes and student activities during the learning process.

Expert validation has 2 stages: 1) validating the validation sheet questionnaire, which is to be used by the validator to validate the module, and 2) validating the module using the validation sheet that has been improved and scored for module assessment. Validating the validation sheet questionnaire helps ensure and revise the various components that will be assessed to validate the module by the validator (Sürücü & Maslakci, 2020). 2 experts improve the validation of the questionnaire validation sheet by their fields. The names of the validators and their fields are listed in Table 3.

Table 3. Names and Fields of Validators

No	Name	Fields
1.	Drs. Gamal Kartono M.Si.	Design
2.	Atika Wasilah S.Pd., M.Pd.	Language

The validation stage of the questionnaire validation sheet had some parts revised. The results of the improvement of each expert's validation sheet are generally listed in table 4.

Table 4. Revised Results of Validation Sheet of Each Validator

No	Description
1.	**Drs. Gamal Kartono M.Si.** a. The font type is too formal try a more relaxed font; b. Too poor in colour, add more colour; c. The illustrations inside the cover should be self-made and in accordance with the title of the book, and d. Pay attention to the layout of the content of the book.
2.	**Atika Wasilah S.Pd., M.Pd.** a. Avoid using conjunctions at the beginning of a paragraph; b. Pay attention to the cohesion between paragraphs; c. Sentence and word/term grammar in accordance with standard language rules; d. There are still many typo words, and e. The language and sentence structure used are appropriate to the students' ability level.

After revision, the next step was scoring by the validators. Design expert validators assessed the layout and content of the module; linguist validators assessed all module language variables. After scoring, data analysis was conducted. The results of data analysis from the validators' assessment scores are listed in Table 5.

Table 5. Validator Assessment Results

No	Variables	Degree of Achievement (%)	Category
1.	Content	73%	Valid Enough
2.	Construct	77%	Valid Enough
3.	Module View	85%	Valid
4.	Language	82%	Valid
	Average	79.25%	Valid Enough

The results of the validator's assessment in table 5 which have 4 variables are as follows: 1) content has a degree of achievement of 73% including a fairly valid category, 2) construct with a degree of achievement of 77% also including a fairly valid category, 3) module appearance with a degree of achievement of 85% including a valid category, and 4) language with a degree of achievement of 82% including a valid category. The average validity of the module as a whole has a degree of achievement of 79.25% and the module includes a fairly valid category. The systematic arrangement of content/material descriptions (Viere et al., 2021), so that module users are given the convenience to understand the module material. The module is clearly defined (Zulaiho, 2021) from the presentation of material, usage instructions, and assessment equipment. The formulation of the module presentation is adjusted to the level of student competence. This matter is in line with Utomo et al (2020) that the right module is appropriate for learning if module is tailored to students needs.

A comparison of the results of the validator's assessment with the degree of achievement of the module validation results for each variable is listed in Figure 3. The results of the validator's assessment in Table 5, which have 4 variables, are as follows: 1) content has a degree of achievement of 73%, including a fairly valid category; 2) construct with a degree of achievement of 77%, also including a fairly valid category, 3) module appearance with a degree of achievement of 85% including a valid category, and 4) language

with a degree of achievement of 82% including a valid category. The average validity of the module as a whole has a degree of achievement of 79.25% and includes a fairly valid category. The systematic arrangement of content/material descriptions (Viere et al., 2021) allows module users to be able to understand the module material. The module is clearly defined (Zulaiho, 2021) from the presentation of material, usage instructions, and assessment equipment. The formulation of the module presentation is adjusted to the level of student competence. This matter is in line with Utomo et al. (2020) that the right module is appropriate for learning if the module is tailored to students' needs.

A comparison of the results of the validator's assessment with the degree of achievement of the module validation results for each variable is listed in Figure 3.
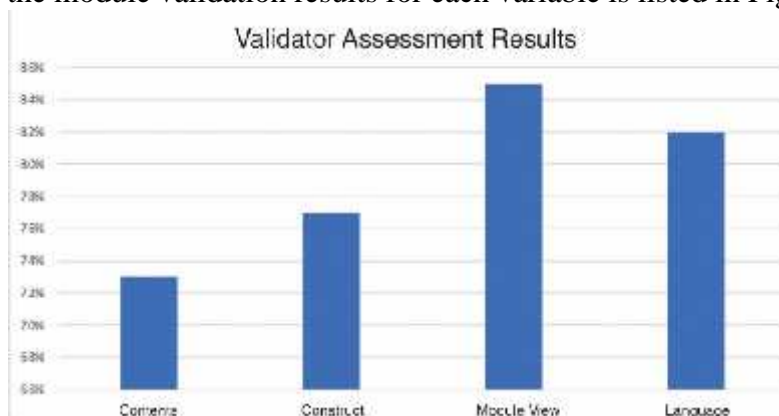

Figure 3. Validator Assessment Results

The practicality of the p-book and e-book-based modules was evaluated by students of the Fine Arts Department who were taking Archipelago Ornament and Batik Craft courses and the test subjects of this research module. After assessing the practicality of p-book and e-book-based modules by students, conduct data analysis. The results of the data analysis are in Table 6.

Table 6. Results of Practicality Assessment by Students

No	Variables	Score Achievement Level (%)	Category
1.	Learnability	86	Practical
2.	Efficiency	85	Practical
3.	Effectiveness of Time	85	Practical
	Average	85.33	Practical

The results of the data analysis of the practicality assessment by students of the Fine Arts Department and also as the test subjects of the p-book and e-book-based modules have three variables, namely: 1) ease for users (Learnability) with a degree of achievement of 86% p-book and e-book based modules including practical categories for users. That is because, in the module, there are instructions for use (Abidin & Wulandari, 2022), making it easier to use; language that suits students can be used by every student and can help lecturers to focus students in understanding concepts. Modules are designed to make it easier for lecturers to guide students during the learning process (Rayanto, 2020); 2) usability (Efficiency) with a degree of achievement of 85%, including the practical category used in the learning process. Because modules can make it easier for students to explain concepts (Kartono et al., 2020), practical modules are hoped to help lecturers direct students in the learning process, 3) effectiveness of time with a degree of achievement of 85%, p-book, and e-book-based modules including the very practical category can streamline time during the learning process. Lecturers practically use the p-book and e-book-based modules developed to guide

students during the learning process and are also more flexible because they do not depend on textbook content (Azis & Lubis, 2023). Therefore, lecturers can use minimum time with optimal results. The results of student learning evaluation, out of 12 students who did not pass 0 people. Student graduation has a percentage of 100%, and students who do not pass are 0%.

The practicality of the module shows that 12 students who use p-book and e-book-based modules in the learning process are 100% complete. Then, based on the results of observations made by 1 observer, the majority of students were active in the learning process. It shows that p-book and e-book modules are practical and effective in learning. The module's practicality value by students has a degree of achievement of 85.33%, including the practical category. A comparison of the degree of practicality of the module by the students is listed in Figure 4.
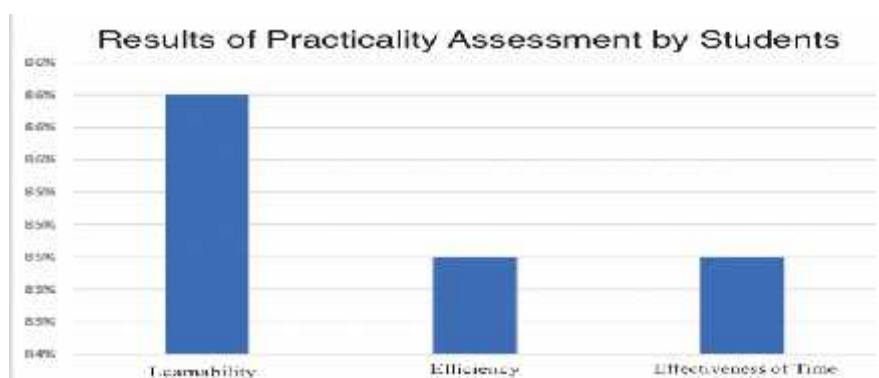

Figure 4. Results of Practicality Assessment by Students

Effectiveness aims to determine the extent to which the module is effective in the learning process. Getting effectiveness value of p-book and e-book-based modules is through observations of student activities during the learning process (Prawita & Prayitno, 2019) and student learning outcomes. Almekhlafi (2021) also suggests that the effectiveness of e-books depends on several factors such as: design, diverse content, and student responses about the positive impact they get or think. The trial of the Archipelago Ornament and Batik Craft module was conducted for four meetings where each meeting was observed by 1 observer. The observer names in this study are listed in Table 7 below:

Table 7. Names of Student Activity Observers

No	Name	Description
1.	Adek Cerah Kurnia Azis, S.Pd., M.Pd.	Lecturer in Fine Arts Education

The categories of student activity by observers are: 1) reading the module and doing exercises, 2) students ask problems while participating in learning, 3) respond to problems from the lecturer or from other students, and 4) complete the tasks given by the lecturer.

Table 8. Student Activities

No	Student Activities	Active Students	Number of students	Score Achievement Level (%)	Category
1.	Read modules and do exercises				
	Meeting 1	12 People	12 People	100	Very Active
	Meeting 2	12 People	12 People	100	Very Active
	Meeting 3	12 People	12 People	100	Very Active
	Meeting 4	12 People	12 People	100	Very Active
	Average			100	Very Active

2.	Students ask questions during the lesson				
	Meeting 1	6 People	12 People	50	Active Enough
	Meeting 2	6 People	12 People	50	Active Enough
	Meeting 3	9 People	12 People	75	Active
	Meeting 4	10 People	12 People	83.33	Very Active
	Average			64.58	Active
3.	Answering questions from the lecturer or from other students, and				
	Meeting 1	5 People	12 People	41.66	Active Enough
	Meeting 2	7 People	12 People	58.33	Active Enough
	Meeting 3	9 People	12 People	75	Active
	Meeting 4	11 People	12 People	91.66	Very Active
	Average			66.66	Active
4.	Complete assignments given by the lecturer.				
	Meeting 1	12 People	12 People	100	Very Active
	Meeting 2	12 People	12 People	100	Very Active
	Meeting 3	12 People	12 People	100	Very Active
	Meeting 4	12 People	12 People	100	Very Active
	Average			100	Very Active

Reading modules and doing exercises are activities that were done first. Students' activities in reading modules and doing exercises from the first to the fourth meeting, each had a percentage of 100%, 100%, 100%, 100%, and with an average of 100% categorized as very active. Students who were absent or had permission were categorized as inactive. During the observer's observation, students were 100% present, or no students were absent or permitted. Based on the observation, students were very active in reading the module and doing the exercises assigned by the lecturer.

Asking questions while following the learning process is the second activity carried out. Students' activities from the initial to the fourth meeting had a percentage of 50%, 50%, 75%, 83.33%, and an average student activity of 64.58% categorized as active students. Based on this data, students who asked questions at the second meeting to the next meeting always increase. Students who asked questions at each meeting were also increasingly varied. Student learning motivation will increase when using modules in learning (Logan et al., 2021) and increase student participation (Raab & Bogner, 2021) in the learning process.

Furthermore, answering questions from the lecturer or other students was the third activity. The percentage of four meetings was 41.66%, 58.33%, 75%, and 91.66%, with an average student activity of 66.66%, including the active student category. Based on the data above, students who respond to questions from lecturers and other students at each meeting always increase. The last activity was completing assignments. Student activities during the four meetings had a percentage of 100%, 100%, 100%, 100%, with an average student activity of 100%, including the category of very active students, because students completing assignments at the end of each lesson is the responsibility of each student. The average student activity of each category from four meetings, in general, is listed in Figure 5 below:
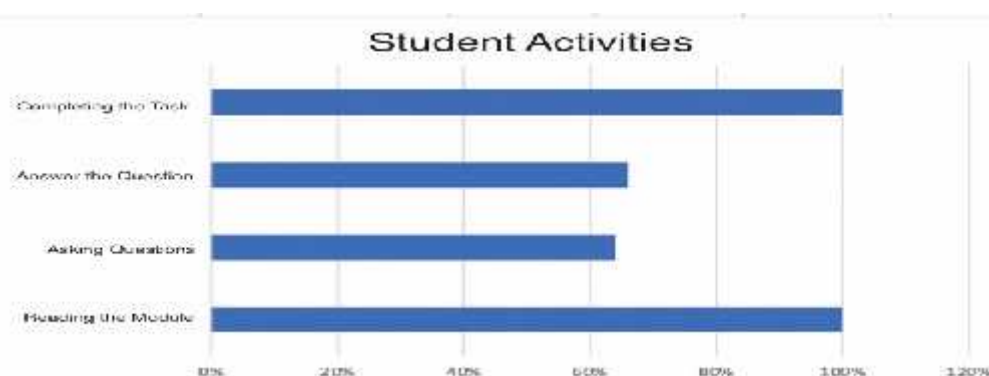
Figure 5. Student Activity Score Results

Learning outcomes based on the results of data analysis, students who passed amounted to 12 people with a percentage of 100% and students who did not pass 0 people with a percentage of 0%. The evaluation results above show that p-book and e-book-based modules are effectively used in learning. Delita et al (2022) suggested that implementing the use of learning modules can improve learning outcomes if module development is carried out according to procedures. Using learning modules in the classroom aims to make students more interested in learning; this can automatically improve learning outcomes (Pérez-Pérez et al., 2020). Valid, practical, and effective modules can be used by students as handbooks in Archipelago Ornament and Batik Craft courses in the Fine Arts Department, making students learn independently and overcoming student learning difficulties.

Conclusion
The conclusions obtained from the results of this study are: a) p-book and e-book-based modules in the Archipelago Ornament and Batik Craft Course at the Department of Fine Arts, Faculty of Languages and Arts, Universitas Negeri Medan are pretty valid, practical, and effective, b) the module validity value is 79.25%, and the module is included in the moderately valid category, then the module's practicality value by students is 85. 33% and the module is included in the practical category in the learning process, and c) the average of the value of student activities from four categories (reading modules, asking questions, answering questions, and completing assignments) observed in the learning process and student learning outcomes is 82.82% including the category of active students, and the module is categorized as effective. So, from the scores and test results of the research results above, the module is valid, practical, and effective enough to be applied in learning at the Fine Arts Department, Faculty of Language and Arts, Universitas Negeri Medan.

Recommendation
Based on the research results, the following recommendations are made; (1) lecturers can be used as a guidebook in teaching students Archipelago Ornament and Batik Craft courses. (2) students can use students as a handbook in taking Archipelago Ornament and Batik Craft Courses at the Department of Fine Arts, Faculty of Languages and Arts, Universitas Negeri Medan, and (3) further research is expected to develop and design a p-book and e-book based modules in other courses as well.

References
Abidin, Z., & Wulandari, T. C. (2022). The Model of Analytical Geometry Interactive Module using Systematic, Active, Effective (SAE) Model to Support Students.

Autonomous Learning and Mathematics Education Competence. American Journal of Humanities and Social Sciences Research, 6(05).

Afsiser, A. I. C. (2021). Distorsi Disleksia melalui Lukisan Abstrak dengan Realitas Berimbuh (AR. *IKONIK: Jurnal Seni Dan Desain*, 3(2), 14–18.

Almekhlafi, A. G. (2021). The effect of E-books on Preservice student teachers' achievement and perceptions in the United Arab Emirates. *Education and Information Technologies*, 26, 1001–1021.

Aryani, D. I., Pandanwangi, A., & Effendi, I. Z. (2021). Multiculturalism of Mythological Images in Batik Motifs. *2nd Annual Conference on Blended Learning, Educational Technology and Innovation (ACBLETI 2020*, 01(01), 514–519.

Azis, A. C. K., & Lubis, S. K. (2023). PEMBELAJARAN SENI RUPA BERDASARKAN PERSPEKTIF KURIKULUM MERDEKA DI SEKOLAH DASAR. *Pena Anda: Jurnal Pendidikan Sekolah Dasar*, 1(1), 10-19.

Azis, A. C. K., Mesra, M., & Sugito, S. (2021). Pengembangan Bahan Ajar Micro Teaching Bagi Mahasiswa Seni Rupa Universitas Negeri Medan. *Gorga: Jurnal Seni Rupa*, 10(1), 223–229.

Delita, F., Berutu, N., & Nofrion, N. (2022). Online Learning: The Effects of Using E-Modules on Self-Efficacy, Motivation and Learning Outcomes. *Turkish Online Journal of Distance Education*, 23(4), 93–107.

Farid, G., Iqbal, S., & Iftikhar, S. (2021). *Accessibility, Usage, and Behavioral Intention of Print Books and eBooks by Medical Students*. Library Philosophy and Practice.

Girsang, N. D. (2021). Literature Study of Convolutional Neural Network Algorithm for Batik Classification. *Brilliance: Research of Artificial Intelligence*, 1(1), 1–7.

Kartono, G., Mesra, M., & Azis, A. C. K. (2020). Pengembangan Media Ajar Grafis Komputer Materi WPAP Dalam Bentuk E-Book Dan Video Tutorial Bagi Mahasiswa Seni Rupa. *Gorga: Jurnal Seni Rupa*, 9(1), 127–132.

Kasman, K., & Lubis, S. K. (2022). Teachers' Performance Evaluation Instrument Designs in the Implementation of the New Learning Paradigm of the Merdeka Curriculum. *Jurnal Kependidikan: Jurnal Hasil Penelitian Dan Kajian Kepustakaan Di Bidang Pendidikan, Pengajaran Dan Pembelajaran*, 8(3), 760–775.

Logan, R. M., Johnson, C. E., & Worsham, J. W. (2021). Development of an e-learning module to facilitate student learning and outcomes. *Teaching and Learning in Nursing*, 16(2), 139–142.

Lubis, S. K. (2022). EVALUASI KINERJA GURU SENI BUDAYA DITINJAU DARI KESESUAIAN LATAR BELAKANG PENDIDIKAN GURU DENGAN ASPEK SENI YANG DIAJARKAN. *Gorga: Jurnal Seni Rupa*, 11(2), 394–401.

Park, J. Y., Kim, C., Park, S., & Dio, K. (2023). Do you judge a book by its cover? Online book purchases between Japan and France. *Asia Pacific Journal of Marketing and Logistics*.

Pérez-Pérez, M., Serrano-Bedia, A. M., & García-Piqueres, G. (2020). An analysis of factors affecting students perceptions of learning outcomes with Moodle. *Journal of Further and Higher Education*, 44(8), 1114–1129.

Prawita, W., & Prayitno, B. A. (2019). Effectiveness of a Generative Learning-Based Biology Module to Improve the Analytical Thinking Skills of the Students with High and Low Reading Motivation. *International Journal of Instruction*, 12(1), 1459–1476.

Raab, P., & Bogner, F. X. (2021). Knowledge acquisition and environmental values in a microplastic learning module: Does the learning environment matter? *Studies in Educational Evaluation*, 71, 101091.

Rayanto, Y. H. (2020). *Penelitian Pengembangan Model ADDIE dan R2D2: Teori & Praktek*. Lembaga Academic & Research Institute.

Reich, S. M., Yau, J. C., Xu, Y., Muskat, T., Uvalle, J., & Cannata, D. (2019). Digital or print? a comparison of preschoolers' comprehension, vocabulary, and engagement from a print book and an e-book. *AERA Open*, *5*(3), 2332858419878389.

Setyawan, R. I., & Purwanto, A. (2019). *Model Pembelajaran Berbasis Proyek (Project Based Learning) Untuk Meningkatkan Hasil Belajar*. Jurnal Dikdas Bantara.

Sugiyono, S. (2016). *Metode Penelitian Kuantitatif*. Bandung: Alfabeta.

Sürücü, L., & Maslakci, A. (2020). Validity and Reliability in Quantitative Research. *Business & Management Studies: An International Journal*, *8*(3), 2694–2726.

Utomo, A. P., Hasanah, L., Hariyadi, S., Narulita, E., & Umamah, N. (2020). The Effectiveness of STEAM-Based Biotechnology Module Equipped with Flash Animation for Biology Learning in High School. *International Journal of Instruction*, *13*(2), 463–476.

Viere, T., Amor, B., Berger, N., Fanous, R. D., Arduin, R. H., Keller, R., & Sonnemann, G. (2021). Teaching life cycle assessment in higher education. *The International Journal of Life Cycle Assessment*, *26*, 511–527.

Wicaksono, A. Y., Suciati, N., Fatichah, C., Uchimura, K., & Koutaki, G. (2017). Convolutional Neural Network Architecture for Batik Motif Image Classification. *IPTEK Journal of Science*, *2*(2), 27–34.

Widadi, Z. (2019). *Pemaknaan Batik Sebagai Warisan Budaya Takbenda* (Vol. 33, Issue 2). Jurnal Ilmu Pengetahuan dan Teknologi.

Wulandari, A. (2022). *Batik Nusantara: Makna filosofis, Cara Pembuatan, dan Industri Batik*. Penerbit Andi.

Zulaiho, D. (2021). The Introduction of a Credit-module System of Education in Uzbekistan Higher Educational Institutions.   , *7*(6), 476–480.