International Journal of Innovative Technologies in Social Science

e-ISSN: 2544-9435

Operating Publisher
SciFormat Publishing Inc.
ISNI: 0000 0005 1449 8214

2734 17 Avenue SW,
Calgary, Alberta, T3E0A7,
Canada
+15878858911
editorial-office@sciformat.ca

ARTICLE TITLE	OPTIMIZATION OF COMPUTER-BASED INSTRUCTION (CBI) MEDIA ON STUDENT LEARNING OUTCOMES
DOI	https://doi.org/10.31435/ijitss.2(50).2026.6085
RECEIVED	28 February 2026
ACCEPTED	30 May 2026
PUBLISHED	08 June 2026
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OPTIMIZATION OF COMPUTER-BASED INSTRUCTION (CBI) MEDIA ON STUDENT LEARNING OUTCOMES

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ABSTRACT

Purpose. This study aims to determine the effective use of Computer-Based Instruction (CBI) in identifying the learning outcomes of students of the Fashion Design Education Study Program at Universitas Negeri Medan..
Methods. This research is a quasi-experimental research, with a population of 133 students consisting of 4 classes. The research design uses a pretest and posttest to see the learning outcomes of students in the Fashion Technology course.
Findings. The use of CBI learning media in the experimental class showed that the achievement of learning outcomes using CBI learning media is better than using other learning media in students of the Fashion Education Study
Research Implications. Integrating learning technology that matches the characteristics of visual and procedural materials can support improved learning quality in vocational education. In addition to providing empirical evidence regarding the effectiveness of CBI in Fashion Design Education, this research also serves as a foundation for the development of more innovative digital learning media to support independent, student-centered learning.
Originality. The novelty of this research lies in testing the effectiveness of Computer-Based Instruction (CBI) in learning Fashion Technology in the Fashion Design Education Study Program, which has visual and procedural learning characteristics. This research provides empirical evidence regarding the ability of CBI to support practical learning, improve learning outcomes, and facilitate student independent learning in vocational fashion education.

KEYWORDS

Computer-Based Instruction (CBI), Quasi-Experimental, Fashion Technology Course

CITATION

Dina Ampera, Veronika Yulisna Sinukaban, Farihah, Yudhistira Anggraini, Ismail Jahidin. (2026) Optimization of Computer-Based Instruction (CBI) Media on Student Learning Outcomes. *International Journal of Innovative Technologies in Social Science*. 2(50). doi: 10.31435/ijitss.2(50).2026.6085

Introduction

Improving the quality of education refers to efforts to improve the quality of the learning process and learning outcomes. Learning takes place effectively, and students experience meaningful learning and are provided with adequate resources, so that learning can be described by the learning outcomes achieved by students. The essence of learning media is to design a set of tools that aim to change the current situation into a desired situation. The function of learning media is essential because the essence of learning depends on the learning model and media that are developed. The description of the quality of vocational education graduates applies a measure that must be accounted for, namely, the quality of graduates according to the size of the society and the industry that uses graduates. The first criterion includes aspects of student success in fulfilling competencies oriented to the demands of the world of work, and the second criterion includes student success in the ability to get a job in accordance with the competency standards of learning outcomes.

Based on observations, it can be seen that several lecturers in charge of the course: 1) lecturers still need the right learning model and media in the learning process, so that learning can be more effective. Previously, the learning model that took place was still carried out conventionally (lectures, questions and answers, discussions, exercises/assignments) and was supplemented with learning media in the form of modules, with PowerPoint delivery tools. This kind of learning makes lecturers dominate learning activities, so that it creates limited space for students, learning should be student-centered. 2) Students make lecturers a single source of information, so that learning activities only prioritize the cognitive aspect, without paying attention to affective and psychomotor aspects. Students tend to keep all the difficulties encountered while studying without making any effort to solve them. When studying, students tend to be passive and as if they have understood what has been taught. 3) The limited time to study in class also makes lecturers only pursue targets so that the material delivered is completed on time. This makes lecturers feel that they have delivered the material well without realizing it, in fact, most students have not mastered what has just been taught, 4) The acquisition of scores in the Fashion Technology course is still not optimal, this is strengthened by the learning results of the average student who has a score with a sufficient category, from 34 students with a score of (A) of 4, a score of (B) of 7, the score (C) totaled 13, and the score (E) totaled 8 students. From this data, there are still students who have not reached competence. this is suspected that several obstacles cause low learning outcomes. The acquisition of competencies that have not been maximized is indicated by the use of learning models and media that have not been maximized, so that students are often bored with participating in learning activities.

Based on the findings, the cause of low student competency results in the Fashion Technology course is suspected to be strong due to the lack of students studying and practicing outside of lecture hours, while the material in the Fashion Technology course is quite extensive. Considering that the Fashion Technology course is a basic course and plays a very important role in the development of fashion technology and the basics of sewing for students, the learning outcomes in this course need to be improved. Therefore, it is necessary to look for various alternative problem-solving methods, which can improve learning outcomes and visibility to be implemented is the use of learning or also known as Computer-Based Instruction, abbreviated as CBI, where CBI is learning using computers that are designed and made to study certain lecture materials. The CBI program is an individualized instruction medium and is a learning activity that can improve learning outcomes. The advantages of using CBI in learning include: First, CBI can be used individually, can learn subject matter independently. Learning like this will encourage students to be more active and can increase independence and confidence. Second, CBI is flexible, because it can learn anytime and anywhere (self-paced). This will greatly help students in increasing their understanding of the knowledge learned through repeated exercises using CBI media. Third, CBI can be used for remedial teaching.

One of the characteristics of the Independent Curriculum that is built is complete learning, where students who have not mastered the competencies as determined must repeat the material until students can achieve the learning results. Fourth, the use of CBI media increases learning motivation, which increases because students learn of their own will and awareness, and use interesting media individually.

Method

This research is a quasi-experimental research, and the type of research is quantitative research. Where the research design is a Nonequivalent Control Group Design consisting of an experimental group and a control group that both received pretest and posttest. In the experimental group, CBI media learning was employed, whereas in the control group, conventional learning methods were used. In this study, conventional learning is not a treatment but is used as a comparison to determine the influence of CBI media learning.

The population in this study consists of four classes of students participating in Fashion Technology learning, totaling 133 students.

No	Class	Number of Students
1	A	34
2	B	33
3	C	34
4	D	32
	Sum	133

The population was drawn to get two classes as research samples, namely class A as the Experiment group, and class C as the control group, and all students in both classes automatically became research samples. The sample in this study was selected using cluster random sampling, where the random sample was students who were already in their respective classes (random in groups); so that the characteristics of the subjects who were the research samples in the experimental group and the characteristics of the subjects in the control group were not the same.

The instrument for collecting data for this research is in the form of an achievement test. The tests include: Written test (objective test for cognition) and deed test or performance test (performance) for the field of psychomotor or skills are carried out during the initial test of students (pretest) and learning outcomes (posttest) for both experimental and control groups. After the test questions are developed, they test questions are consulted with relevant experts (expert judgement) to obtain the validity of the test and then tested. This trial aims to determine the validity, reliability, level of difficulty, differentiation, and deception function of the test questions.

In this study, the reliability coefficient of the instrument (test) was calculated by the formula Kuder Richardson (KR-20). The reliability of an instrument is expressed by the reliability coefficient obtained through a certain formula. The minimum reliability coefficient according to experts (Lubis: 2013) is 0.8. So based on the analysis of the trial data, it was obtained that the reliability coefficient = 0.925, then the instrument of this study is reliable

Results

The data on the average score of the initial test and the average score of the learning outcome (posttest) from both the experimental and control groups were described as the processing and analysis of learning outcome data covering the cognitive field and the psychomotor field. The normality test is carried out by the Kolmogorov-Smirnov Test or also called the K-S test. Assisted by using SPSS version 20, based on the K-S test at the level of $\alpha = 0.05$. If the significance value is greater than 0.05, then the data is normally distributed. The normality test calculation uses pretest data and posttest data in both experimental and control groups.

The results of the calculation of pretest data for the group of students who participated in learning using CBI media (experimental class) and students who participated in conventional learning (control class) can be seen that the significance value in the experimental group was 0.396 (>0.05) using a non-parametric statistical test while the significance value in the control group was 0.200 (>0.05). It was concluded that the population distribution for the pretest data of the experimental group and the control group was normally distributed. The calculation is clearly seen in Table 2.

Table 2. Test of Normality of Data Distribution Pretest of Experimental and Control Groups one-sample Klomogorov-Smirnov Test

		Experimental Group Pretest
N		46
Normal	fean	42.24
Parameter Plot.. b	Std. Deviation	3.749
Most	Absolute	.132
Extreme Defferences	Positive	.132
	Negative	-.094
	Kolmogorov-Smirnov Z Asymp.Sig (2-tailed)	.897 .396

The calculation of posttest data for student groups who participated in learning using CBI media (experimental class) and students who participated in conventional learning (control class) shows that the significance values in both the experimental group and the control class were 0.113 (>0.05) and 0.200 (>0.05). It was concluded that the population distribution for the posttest data of the experimental group and the control group was normally distributed.

Table 3. Homogeneity Test of Data Distribution: Pretest of Experimental and Control Groups

Test of Homogeneity of Variances			
Pretest			
Levene	df1	df2	Mr.
Statistic			
,589	1	91	,445

Table 4. Normality Test of Posttest Data Distribution of Experimental and Control Groups

Test of Normality						
	Kolmogorov-Smirnova			Shamiro-Wilk		
	Statistic	df	Mr.	Statistic	df	Mr.
Posttest Experiment	,118	46	,113	,973	46	,368
Posttest Control	,090	46	,200	,971	46	,295

Homogeneity Test

The homogeneity test was carried out to test the similarity of student data as a requirement for hypothesis testing. The calculation was carried out with the SPSS version 20 program using Levene's test with the F test. The hypothesis proposed for the homogeneity test: H0 = the variants in each group are the same (homogeneous), H1 = the variants in each group are not the same (not homogeneous). Basis for decision-making:Accept: H0 = if the score of sig.>significant alpha (0.05), Accept: H1 = if the score of sig. < significant alpha (0.05).

The results of the calculation of pretest data from the group of students who participated in learning using CBI media (experimental class) and students who participated in conventional learning (control class) it was seen that the significance score for the data of students in the control class and experimental class was 0.445 (>0.05). It is stated that H0 is accepted and variant. The results of the calculation of posttest data from the group of students who participated in learning using CBI media (experimental class) and students who participated in conventional learning (control class) it was seen that the significance score for the data of

students in the control class and experimental class was 0.132 (>0.05). It was stated that H0 was accepted and the variants in each group were the same (homogeneous). The calculation is clearly seen in Table 5.

Table 5. Homogeneity Test of Posttest Data Distribution of Experimental and Control Groups

Test of Homogeneity of Variances			
Posttest			
Levene	df1	df2	Mr.
Statistic			
2,311	1	91	,132

Uji Hipotesis

The results of the calculation using pretest data on both groups of students, both those who participated in learning using media (experimental class) and students who participated in conventional learning (control class), obtained a significance value = 0.896, greater than the significance level = 0.05. It was stated that H0 was accepted, and the research hypothesis was rejected. This hypothesis reveals that there is no difference between the pretest scores of the experimental group using media (CAI) and the pretest scores of the control group that uses conventional learning in the Fashion Technology course. (H0: μ1=μ2, Ha: μ1≠μ2).

The results of the calculation using posttest scores in both groups of students who participated in Fashion Technology learning (experimental class) and followed conventional learning (control class) obtained a significance value = 0.000, smaller than the significance level = 0.05. It was stated that H0 was rejected and the research hypothesis was accepted. This hypothesis reveals that the learning outcomes (posttest) of the experimental group that used learning media (CBI) were higher than the learning outcomes (posttest) of the control group that used conventional learning in the Fashion Technology course. (H0: μ1= μ2, Ha: μ1>μ2), it is stated in Table 7.

Table 6. Test of the Hypothesis of Data Distribution: Pretest of the Experimental and Control Groups
Independent Samples Test

		Pretest Experiment & Control	
		Equal variances assumed	Equal variances not assumed
Levene's Test for Equality of Variances t-test for Equality of Means	F Sig. t df Mr. (2-tailed) Mean Difference Std. Error Difference 95% LTrust dence w Interv er al of In the Differ pp ence er	,589 ,445 ,233 91 ,817 ,197 ,845 -1,483 1,876	,233 89,454 ,816 ,197 ,844 -1,480 1,874

Table 7. Posttest Data Distribution Hypothesis Test of Experimental and Control Groups
Independent Samples Test

	Posttest experiment and control
	Equal variances assumed
Levene's F Test for Mr. Equality of Variances	2.311 .132
t-test for t Equality df of Mr. Means (2- (d) Mean Diff eren ce Std. Error r Diff eren ce 95% Low Confidenc er e Interval Up of the er Differenc and	15.232 91 .000 20.253 1.330 17.612 22.895

Discussion

The findings of this study show that learning using CBI media can improve the learning outcomes of fashion technology subjects, as the theory has been put forward that the learning process carried out by students will produce changes in the environment and the students themselves, and those changes are commonly referred to as learning outcomes. Each individual will become an adult as a result of learning and experiences experienced throughout his or her life (Lestari, 2017). Learning is a process where the mechanism will change behavior as a result of experience (Firmansyah, 2015).

Furthermore, learning outcomes are students' abilities obtained after learning activities (Nugraha, 2020). Learning outcomes are certain competencies or abilities achieved by students after participating in the teaching and learning process and include cognitive, affective, and psychomotor skills (Wulandari, 2021). Opinion to Mustakim (2020), learning outcomes are everything that is achieved by students through certain assessments that have been determined by the previous educational institution's curriculum. In the context of the learning outcome assessment process, an accurate and in accordance with the goals of education and teaching is needed.

An indicator of student success in the learning process is to achieve maximum learning outcomes. Low learning outcomes can be influenced by several factors including (Purwanto, 2002): 1) Internal factors, namely factors contained in students where students are less interested in learning and practicing outside of school hours so that students are less active and independent; 2) External factors, namely factors that exist from outside the student where the strategies, methods, and learning media used have not fully implemented the new learning paradigm so that students are less interested in getting involved with the learning media.

According to Sudjana (1990), Some Reasons Why Teaching Media can enhance learning outcomes include the benefit of media in the teaching process that produces more varied teaching methods, clearer subject matter, and attracts the attention of students, students so that it causes motivation to learn. Also, with regard to the level of thinking and the ability of humans to absorb different materials according to their level of development.

The progress of science and technology, especially in the field of education, is marked by the development of new ways of teaching. The use of computer-assisted learning media has received great attention because of its ability and utilization in learning activities, so that students can interact directly with the material that has been programmed into the computer. This is what is called CBI (Computer-Based Instruction) media. According to Nasution (1994), CBI media has been developed and has proven to be useful in helping lecturers teach and helping students in learning independently. The need for advanced and quality information and communication technology, especially learning media that is always developing and is adapted to the latest world of education, is expected to improve the quality of education in Indonesia, especially vocational education.

Through learning using CBI media, it is hoped that it can meet the needs of advanced and quality technology. Applying Computer-Based Instruction media in the teaching and learning process has several

advantages. Lai (2006) argues that with CBI-based learning, which can provide fun learning and communicative learning activities, reduce learning pressure and anxiety, provide repetitive lessons as often as necessary, encourage learning motivation, influence learning attitudes, and build students' strategies and confidence. Computer Based Instruction (CBI) is also inseparable from its shortcomings, Heinich et al (2002) said that computer based instruction is very easy to be duplicated without permission from the developer, then also in computer based instruction gives high expectations for its users that learning happens with little and without effort, computers are also only used to teach for limited purposes, Killing student creativity, reducing social interaction, continuous computer use fading communication among students. These advantages and disadvantages are used as the basis for the application of computer-based instruction and strive to minimize their weaknesses so that they can improve learning outcomes.

Use media CBI can make it easier for students to learn anywhere and anytime, repeat learning materials that are poorly understood, do exercises, and be able to find out their weaknesses because the exercises are designed by lecturers equipped with answer keys and necessary explanations so that CBI can increase learning motivation, creativity, and confidence, and more activate students in the learning process as well as become student-centered learning. With the CBI (Computer-Based Instruction) media approach, it is applied to Fashion Technology learning which can create varied learning so as to reduce boredom in following lessons and can also motivate students to follow because there are interesting things in it (Anam, 2021, Mulyani & Haliza, 2021).

The results of this research on the use of CBI media are consistent with the findings of previous research carried out by Ampera (2019), Wahidah (2022), Costu (2012), Nurhayati (2021), concluding that computer-assisted learning (CBI) can improve student learning outcomes. Computer-Based Instruction (CBI) learning media is a method developed with computer media, where the method of teaching directly to users through interacting with learning topics that have been packaged in a software application. This learning objective serves to make it easier for students, and this is an alternative in overcoming several problems, such as limited time, books that are difficult to find, large expenses, and increasing learning satisfaction for users and can reduce the boring atmosphere

Conclusions

The results of this study can be concluded as follows: The use of CBI (Computer Based Intruction) media in the Fashion Technology course can increase the activities of lecturers and students. By looking at the increase in lecturer activities from within the criteria is quite good. The initial test score of the experimental group using CBI media is the same as the initial test score of the control group that uses conventional learning in the Fashion Technology course. The posttest learning outcomes of the experimental group using CBI were higher than the posttest learning outcomes of the control group using conventional learning in the Fashion Technology course.

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