

ONLINE LEARNING BASED ON CONSTRUCTIVISM TO SUPPORT UNIVERSITAS TERBUKA DISTANT LEARNERS

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ABSTRACT: *The use of digital and network technology has significant effects on the human learning process. It changes the paradigm of learning and instruction. Recently, by using digital and network technology, students can learn without facing the restriction of time and place. In addition, the students can use various learning resources and materials to support their efforts in gaining knowledge and skills. This article will elaborate on the possibility of implementing constructivism learning theories in designing an online learning tutorial program that will support and facilitate distance learning students to build better knowledge and skills. Universitas Terbuka (UT), an Indonesian state university that implements a distance learning system, conducts an online learning program to support the students' learning process. The use of constructivism theory in online learning is expected to enable students to widen their knowledge and sharpen their skills while learning. This study uses a research and development approach to create a constructivist online learning program that can facilitate distance learning students' achieving their learning objectives. The result of the study indicated that the use of constructivism learning theories facilitated the distance learners to attain better learning achievement in the Research Methodology course.*

Keywords: *Learning theory, constructivism, online and distance learning.*

INTRODUCTION

Introduction The advancement of computer and network technology significantly impacts the way people learn knowledge and skills. (Rivalina & Siahaan, 2020). Today the process of learning is very different from the previous time. With the abundance of knowledge and information available on the web, people can easily get the required knowledge and information to achieve the predetermined learning

competencies. The use of computer and network technology triggers some new modes of learning. The online and blended learning modes were used to deliver learning substances that can be learned by the students.

Universitas Terbuka (UT), a higher education that employs the open and distance learning mode, uses an online learning system to support its student's

learning process. UT conducts online learning, which is called online tutorials for all of the offered courses. The ultimate aim of this online tutorial is to facilitate the students' learning process to study the offered course content.

The students who enroll in the online tutorial have to interact actively with the tutor, the college students, and the course content. It is believed that the active learning interaction will enhance the student's comprehension of the course content. Two ways of communication or learning interaction between the tutor and students, among the students, and between the students and the course content will provide a better chance for the students to internalize the course substances they learned.

Online tutorial mode which is used as the students learning support by UT provides better possibilities for the students to comprehend the substances of the course. The present article will elaborate on the use of constructivism learning theory as a base for conducting the online tutorial program at the UT.

The purpose of the study is to find an alternative approach or learning theory that can facilitate the open and distance learning students to attain the learning objectives of the Research Methodology Course. After completing the course, the students must be able to write a research proposal that is based on their current study and research interests.

This research and development study proposes the following research questions, such as:

- How do the students gain knowledge and skills that can be learned through online learning?
- Is the constructivism approach or learning theory integrated into online learning able to facilitate the students' attainment of the course learning objectives effectively?

Gilbert (2015) defines online learning as learning that takes place partially or entirely over the Internet. The term "online learning" is used to describe distance learning or correspondence courses that deliver content through the internet.

Online learning encompasses a range of technologies such as the world wide web, email, chat, new groups, and text, audio, and video conferencing delivered over computer networks to impart education (Dhull & Sakshi, 2017).

Abuhassna et al. (2020) conducted a study on exploring and investigating potential factors influencing students' academic achievements and satisfaction with using online learning platforms based on Transactional Distance Theory (TDT) and Bloom Taxonomy Theory (BTT). The empirical results strongly support the integrative association between TDT and BTT theories about using online learning platforms to improve students' academic achievements and satisfaction.

The existence of online learning is revolutionizing some areas of study through increased possibilities for learning and alternative formats for gaining required knowledge and information. The use of online learning enables the students to learn the course substance more flexibly.

UT provides wide access for students to learn the course substances through online learning. All of the UT courses are offered through the online learning program. Online learning is not the main learning activity for these students. It is aimed as a learning support system that can facilitate the students' learning process to attain the course learning objectives.

By participating in an online learning program, the student will interact with the online learning program. This offers a chance for the student to build and explore the content of the offered course.

The learning interactions that occur in the online program enable the student to build and construct their knowledge and skills to achieve the predetermined competencies of the courses.

Aspillera (2010) noted the nine potential benefits of the online learning program, such as (1) schedule flexibility; (2) ease of accessibility; (3) range of options; (4) students' control of study time; (5) chance for learning interaction; (6) online communications; (7) time to absorb material; (8) money saving option; and (9) no more expensive textbooks (Aspillera, 2010).

In addition, Heap (2017) stated the following learning advantages for students who participate in an online learning environment:

- Studying online gives the students more flexibility in learning,
- The students experience a flexible schedule and environment,
- The students pay the financial cost of studying,
- The students implement self-discipline and responsibility,
- The students can focus on the learned subject and substance.

Besides providing some advantages for the students, participating in online learning also provides some of the following disadvantages. Harrison et al. (2017) noted some disadvantages of online learning, such as:

- Online education requires immense self-discipline,
- Lack of direct interaction with the instructor,
- Lack of company from other students,
- The workload is bigger than in traditional education, and the
- Online learning institutions might not be accredited.

Tanis (2020) conducted a study that implements online learning principles that include: student communication and collaboration; active learning techniques; prompt feedback; appropriate time for tasks; high-performance expectations; and respect for diverse learning styles or preferences. The result of the study indicated the role of faculty-student communication, students

communication, and content engagement in online classes are very important in conducting an online learning program. Besides, the online student must know high-performance expectations including high standards of academic and personal integrity.

Students and faculty engagement is required in a well-designed class. Students have to navigate technology and submit timely work. To create effective online learning, the online instructor must be energetic, organized, and communicative with students and have a consistent presence in the online classroom to provide an active, quality learning experience through faculty, student, and content engagement.

To implement the online learning program effectively, UT must design and develop a program that uses the appropriate theory and principles that enables the students to construct knowledge and skills.

Constructivism is an approach to teaching and learning that is based on the view that cognition or learning is considered the result of "mental construction". In this matter, the students learn by integrating the new knowledge and information with the knowledge and information they already know.

Constructivists believe that learning is caused by the context in which knowledge and skills are taught, as well as by students' beliefs and attitudes.

Constructivism learning theory explains how people might acquire knowledge and learn. This theory, therefore, has direct application to education. The constructivism learning theory suggests that humans construct knowledge and meaning from their experiences. It is not a specific pedagogy. Piaget noted that constructivist learning has had a wide-ranging impact on learning and teaching activities. It is considered an education reform movement.

Constructivism is a theory that is based on observation and scientific study of how people learn. Bada & Olusegun (2015) say that people construct their understanding

and knowledge of the world, through experiencing things and reflecting on those experiences.

Constructivism is considered an approach to teaching and learning that acknowledges that information can be conveyed but understanding is dependent upon the learner. According to Alanazi (2019), people learn and develop knowledge individually in social learning environments by constructing their schema based on the information presented to them.

When we encounter something new, we have to reconcile it with our previous ideas and experience, maybe changing what we believe, or maybe discarding the new information as irrelevant. In any case, we are active creators of our knowledge.

To create new knowledge and skills, the learner must ask questions, explore, and assess what they know. The constructivist view of learning can point toward several different teaching practices in the classroom.

Constructivism is an approach to teaching and learning based on the premise that cognition (learning) is the result of "mental construction." In other words, students learn by fitting new information together with what they already know. Constructivists believe that learning is affected by the context in which an idea is taught as well as by students' beliefs and attitudes (Bada & Olusegun, 2015).

Constructivism as a paradigm or worldview proposes that learning is an active, and constructive process. The learner is an information constructor. They actively construct or create their subjective representations of objective reality. The new information is linked to the prior knowledge to build a new understanding of the concepts or knowledge.

RESEARCH METHOD

The research and development approach in this study was used to determine whether the constructivism approach or learning theory can aid the learning process of open

and distance learning students at UT in mastering the course.

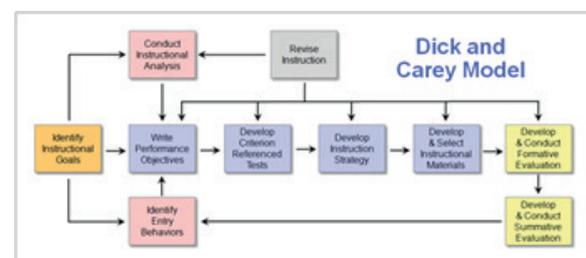
In other words, a research and development model called the systematic research and development model proposed by Borg, Gall, and Gall (2007) was employed to create a constructivism-based online learning program for the Research Methodology course.

This course is compulsory for all UT students. The learning goal of this course program is to enable the students to write an appropriate research proposal related to their study interests.

Borg et al. (2006) adopted the Systematic Design of Instructional Model written by Dick et al. (2015). This model of research and development consists of the following systematic and systemic steps, such as:

1. Identify instructional goals
2. Conduct instructional analysis
3. Analyze learners and context
4. Write performance objectives
5. Develop an assessment instrument
6. Develop an instructional strategy
7. Develop and select instructional materials
8. Design and conduct a formative evaluation of instruction
9. Revise instruction
10. Design and conduct a summative evaluation of instruction.

These steps of the systematic research and development model can be summarized in the following picture.



Picture 1

The Systematic Instructional Design Model

Source: <https://www.bing.com/images/>

In this study, these ten systematic and systemic steps are divided into the following three major phases: (1) the design phase; (2) the development phase; and (3) the research phase. Steps 1 through 6 comprise the design phase. The development phase consists of step number 7. This study's research phase consists of steps 8 through 10.

This study was done until step number nine was conducted: formative evaluation of instruction. These three systematic and systemic design phases can be depicted in the following picture.



Picture 2
Phases in the Systematic Research and Development Model

Integrating the constructivism learning approach into the online learning program was done in the design phase. The result of the design phase is the “blueprint” of the online learning program that implements the theory of constructivism learning.

The blueprint of the instructional program was used as the basis for producing the online instructional materials that will be uploaded into the available Learning Management System (LMS).

The development phase of this research and development approach was done to produce the draft of the online learning program that implements the theory of constructivism learning.

This present research involves several experts, such as content specialists, media specialists, instructional designers, and computer programmers. They offer some useful suggestions for effectively using the constructivism learning theory-based online tutorial program.

The research phase of this study implemented the three stages of formative evaluation, such as one-to-one evaluation, small group evaluation, and field trial

evaluation. The stages were employed in systematic and systemic order.

The one-to-one evaluation aims to get information regarding the reaction of the target participants toward the initial stage or draft of the online tutorial program. This stage is also used to find major weaknesses of the evaluated program that can be revised. This stage involves the three different characteristics of the respondents as participants. The present study engaged students with low, medium, and high learning achievements.

These respondents were asked about the clarity, impact, and feasibility of the program while studying constructivist-based online learning. The results from the one-to-one evaluation stage were used to revise the draft of the program.

The small group evaluation stage was aimed at getting input from the ten participants or respondents regarding the initial implementation of the online tutorial program. In this stage, the respondents were asked about the clarity of the program substance. Again, the revision was done based on the inputs gained from the small-group evaluation stage of the formative evaluation stage.

In the last stage, the program was evaluated by involving thirty students as the participant in the field trial steps of the formative evaluation. One-shot pre- and post-test quasi-experimental designs were employed to gain information concerning the impact of the online tutorial program on the students' learning achievement.

FINDING AND DISCUSSION

The use of the constructivism learning approach in the online learning of the research methodology course encourages the students to elaborate on the course content (Chan, 2010). Besides, the constructivism-based online learning program also enhances the knowledge and students' learning achievement in the Research Methodology Course.

Ramsook & Thomas (2019) researched Implementing the Principles of Constructivism and Connectivism. Their study concluded that when teachers apply the principles of constructivism and connectivism, teaching and learning become more profound and motivative, resulting in enhanced student performance. The findings can be considered in the revisioning of curriculum for teacher education programs and by extension, education in general.

The formative evaluation of the program, which employed the program's three evaluation stages, indicated the study's positive results. In general, the respondents look more enthusiastic about doing the given learning assignments. They were engaged in the course substance – research methodology. Research has historically revealed there are strong correlations between student engagement which is defined as attention to the area of focus, active participation in learning, time on task, and student achievement. These correlations are still strong for all levels of instruction, across all subject areas, and for varying instructional activities (Dyer, 2015).

The result of the one-to-one evaluation step of the program showed that the students, as the respondents, show positive responses and enjoyed the online learning with the constructivism theory-based used as the instructional strategy.

In addition, in this step, the program was revised based on the inputs and information given by the respondents regarding some difficulties in studying the structure and course content. The result of the one-to-one formative evaluation step is a revised program draft that would be evaluated formatively in the following step.

The small group evaluation with the eight students or respondents indicated that using the constructivism approach in online tutorials allows the students to actively interact with tutors, colleagues, and course materials. Nevertheless, some weaknesses regarding the difficulties to understand the concepts or substances still appear after conducting the small-group evaluation. The weaknesses that appear in the program were revised to make the program draft ready to be evaluated in the field try-out step.

At the field try-out session, the revised program that implemented the constructivism approach showed a significant impact on students' learning achievement in the research methodology online course. The statistical significance by comparison of the pre-test and post-test results in a p-value of less than 0.01, below the alpha value of 0.05. Therefore, there is a statistically significant difference between the pre- and post-test scores of respondents after studying the constructivist-based online learning program. The significant difference between pre- and post-test scores of the respondents can be seen in the following table.

	Pre-test	Post-test
Means	51.07	68.67
SD	3.57	3.88

With a significant level of $p < 0.05$, the statistical analysis indicates that there is a significant improvement between the pre-test and the post-test of the participants' scores. It can be concluded that the use of constructivist learning theory as an instructional strategy facilitated the students to attain the predetermined online course of Research Methodology.

The result of the study can be summarized in the following table.

*Table 1
The Formative Evaluation Results of the Study*

Formative Evaluation Step	Data Gathering Method	Evaluation Results
One-to-one evaluation stage	Focus group discussion with three students who use the constructivism-based online learning program.	The students as the respondents show positive reactions and enjoy learning with the program of constructivism theory-based online learning. Some of the weaknesses of the program regarding the difficulties of understanding the course content were revised.
Small group	Program try out with 10 respondents	The use of the constructivism-based online

evaluation stage	who use the constructivism-based online learning program.	learning program enhances students' learning motivation. Respondents enjoy learning interactively with tutors, colleagues, and course content both in synchronous and asynchronous modes. Some weaknesses that still appear in the program draft were revised.
Field try out	Program try out with 32 respondents who use the constructivism-based online learning program.	The constructivism-based online learning program significantly gave a significant impact on the students' learning achievement. The students were able to achieve the predetermined learning objectives.

Stoeckel (2020) conducted a literature study on constructivism online learning and found that implementing constructivist learning theory is challenging, but not impossible. Instructors must carefully attend to the goal of instructional activities.

When an online course is designed and developed, it can be delivered in a way consistent with constructivist learning theories. Synchronous and asynchronous learning interaction in online learning makes it possible for students to build their learned knowledge and substances.

SUMMARY

Implementing the constructivism learning approach to an online tutorial program enhances the students' learning achievement in the research methodology course. The use of the constructivism approach in online learning enables distant learners to elaborate on course content actively. The applied approach enables the students to construct learned concepts by discussing them with instructors and peers.

In addition, by actively participating in the constructivism online learning program, the students will do interactive learning with the tutor, their colleagues, and the course substances. The learning interaction between the students and tutor and among the students is done both synchronously and asynchronously.

The constructivism approach used in online tutorials has some advantages for students studying a research methodology course. The constructivist instructional strategy gives the students more flexibility in learning. In this matter, the students experience a flexible schedule and environment.

Learning through a constructivist approach enables the students to implement self-discipline and responsibility in learning. The constructivist approach implemented in an online program can make the students interact in two ways when studying learned subjects and substances.

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