

Promoting Higher Qualification for Chemistry Teacher through Distance Education in Indonesia

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Abstract. A higher degree for a chemistry teacher education program is often considered idealistic. This opinion mainly refers to the characteristics of chemistry itself. On the other hand, distance education promotes open and flexible characteristics in services. As one of the study programs in Universitas Terbuka, the chemistry department offers more flexible services to students to reach their competencies as a bachelor's degree compared with the traditional study program in Indonesia. However, due to its abstract and requiring hands-on activities in understanding chemistry, the distance education system requires more rich approaches to ideally facilitate student learning on chemistry. To meet the standard of the higher degree education system, the Study Program has made several efforts to fulfill significant achievement in implementing an educational program, namely 1) accreditation, 2) flexibility, 3) personal support and services, 4) study material, and the digital learning environment. Study Program continuously carries out efforts to improve the learning program.

INTRODUCTION

Many experts have discussed the characteristics of distance education. The Distance Education System is characterized by geographical and time separation of teachers and students, and this distance is closed by using technological resources (Caserotti, F. *et al.*, 2002). Learning through this system can be done anywhere and uses various media (Keegan, 1991). Although separate, there is interaction in the learning program. Bates (1995) divides it into two categories: interaction between students with teaching materials and the interaction between students and tutors or students and students. A similar finding was revealed by Moore (1986) on Higher Education in Distance Education, and the instructor can be said as a tutor, whose function is to prepare learning material through various media, to become a facilitator who helps students to be able to build interactions between learners, instructors, teaching materials, and students. Learning basically takes place by involving students and instructors. Learning that occurs through distance learning tends not to place tutors as an expert in all materials but as facilitators of the learning process. The implementation of learning is characterized by the interaction between the components involved. Some unique issues appear while implementing such processes which are mainly related to procedural processes requiring human and system involvement. This paper discusses how the Chemistry Education program of study processes its services starting from planning, doing, and evaluation stages through the higher open and distance education system. A literature review was conducted by collecting several books, magazines, and documents related to the purpose of this paper. In addition to this technique, it is carried out to express various views that are relevant to the topic of discussion regarding the implementation of distance education which is applied to the Chemistry Education study program. The topics used to consist of: 1) Learning system, and 2) Implementation system. Indicator of the learning system includes 1) open accessibility, 2) freedom of time, 3) freedom of pace, 4) freedom of place, 5) open programming, 6) open to people. While the indicator of the implementation system includes: 1) accreditation, 2) flexibility, 3) tuition fees, 4)

personal support and services, 5) study material, and the digital learning environment. Data obtained based on literature studies and activities that take place in the study program and analyzed descriptively.

DISCUSSION

Learning System

The criteria of freedom of time, freedom of pace, and freedom of place are shown by the characteristics of Open University students who are scattered from various regions in Indonesia. At present Open University has 40 offices in various regions offices. The students can study and register at one of the region’s offices by attending learning programs wherever they are, such as at work, home, forming study groups by using the offices’ facilities or elsewhere. Students are free to determine the learning model, they can study independently, build study groups or develop online discussions. This can happen because students have the email address of each student who takes the same course obtained through online tutorial activities provided by the institution. While freedom on time, students can determine their own study time, including determining the registration of taking courses and the number of courses chosen/registered in a particular semester. There are no restrictions on taking courses and limitations on the period of study so that completion of student studies varies but on average students can complete studies according to the length of study listed in the curriculum or an excess of one to three semesters of the number of semesters that must be taken. The open people criterion cannot be applied by the study program, because students registered are those who have become chemistry teachers at high school, so they are not open to anyone. While the open programming criteria cannot be fully applied. Students who have been enrolled in the study program are required to follow all courses set by the study program. Courses taken outside the curriculum are classified as electives. The teaching materials used have been provided by the institution are a handbook for each course and digital teaching materials. Thus teaching material is used through various media such as printed teaching materials as the main teaching material, equipped with audio cassettes, VCDs, interactive CDs, and computer and internet-based learning materials.



FIGURE 1. Examples of teaching materials developed by UT contained in UT-OER

In addition, students also get instruction if they want to use other resources. The materials have also been uploaded as stated on the institution’s Web. While UT-OER includes ITV-UT, Journal, Digital Library, Online Smart Teacher Portal (GPO) which can be accessed through the address (GPO: <http://gurupintar.ut.ac.id/new>), Learning Objective Material (LOAM, and UT open courseware.

The learning materials are developed by a team that involves experts in material experts, instructional designs, linguists, and media experts. They come from well-known state institutions. The activities of the experts are coordinated by the course manager as the person in charge of the courses from the academic staff of the study program. Examples of developing learning materials that show the involvement of experts are illustrated as follows.



FIGURE 2. Involvement of experts in developing learning materials

Students are also given online tutorials as a learning service provided by institution. Tutorial aims to provide learning assistance to students for 8 sessios. In the tutorial students can get additional theoretical information, discussion and get practice doing assignments.

PRESENCE

✚ 📄 1st SESSION ATTENDANCE ✎
Edit ▼

To confirm student attendance in Tuton class, please click Attendance for Session 1 !

If the attendance value is 100, it means that you have successfully accessed the Tuton attendance for this session. If the attendance value is not 100, please try again, click attendance until you click the Continue or Continue button. Henceforth you can access other Tuton materials.

✚
Edit ▼

INITIATION MATERIALS 1

✚ 📄 INITIATION 1 ✎
Edit ▼

✚ 📄 INITIATION 1 ppt ✎
Edit ▼

✚
Edit ▼

DISCUSSION

✚ 📄 DISCUSSION.1 ✎
Edit ▼

Course management

QUIZ 1

- QUIZ 1 Edit
- QUIZ INSTRUCTION Edit
- Edit

ASSIGNMENTS

- ASSIGNMENTS 1 Edit
- ASSIGNMENT SCORING GUIDELINES 1 Edit

Hidden from students

[+ Add an activity or resource](#)

FIGURE 3. Example of content in tutorial online

The statement in Figure 3 shows an explanation of the material to be studied as well as a reminder of what to do and what not to allow during the tutorial. In addition, there is also information on the grades that will be obtained if you successfully complete this online tutorial (tuton) task and achieve your grades.

Through online tutorial activities, students can not only participate in learning from tutors, but also communicate with tutors and other students. Communication between students takes place through discussion forums provided in online tutorials, as shown in the following example.



FIGURE 4. Example of student discussion patterns

Through the learning given, students have been invited to express ideas explicitly using their own language, as well as provide opportunities to think about their experiences. Hopefully students can think creatively, imaginatively, encourage reflection on the concepts they have learned. Learning like this is one of the learning strategies that are widely used by teachers and in learning with a constructivism approach (Mustafa, C, 2008).

Like other tertiary institutions, the study program also compiles the competencies expected from its graduates, both as stated in the graduate competencies and the competencies expected from each course. To measure students' mastery of predetermined competencies, and evaluation of learning outcomes in the form of tests on the final examination. Students can take an exam that location has been determined but if the student is on duty in another province they can then report to the exam manager to move to the nearest exam location. The examination is conducted in writing and is carried out at the same time in all test locations both in Indonesia and abroad. In addition to the written exam, online exams (SUO) are also provided every semester

Implementation System

Chemistry Education students are spread all over Indonesia and spread in several region offices in almost all provinces in Indonesia. During the 2019 registration period, there are 149 students registered as Chemistry Education study program. Students can register online, according to the time they want.

In organizing the program has been in line with the principles of the implementation of distance education, the existence of students who are separated from the learning manager, the use of various media in delivering teaching materials, the collaboration of several supporting agencies such as offices post, bank, vendor, shared library, other universities and so on.

Since 2002 institution has developed a quality assurance system (SIMINTAS-UT). accreditation from the National Accreditation Board for Higher Education (BAN-PT), while for the international level institution has successfully obtained ISO 9001 and The International Council for Open and Distance Education (ICDE).

The application of flexibility in carrying out its learning program is indicated by the absence of imposing drop out or no limitation of the period of study completion. In addition, there are no age restrictions, and diploma years when registering at UT as well as student learning methods and places. Thus students enrolled in the Chemistry Education study program at the Open University have varied ages but they have worked as teachers.

While the institution has also provided a number of services to students including 1) information services, which can be accessed through the UT website at <http://www.ut.ac.id>, the information system used by the study program for academic administration services is the Student Application Record System (SRS). The SRS application is used to access student database in solving academic cases, such as the case of student registration, cases of the information of examination result 2). Learning assistance services, in the form of face-to-face tutorials or online tutorials, TV and radio broadcasts and online self-training, 3). Academic guidance, such as academic consultation, can be done directly to study programs or through region office, Website (e-mail, communication forum, video conferences and SMS, 4). Academic administration services, including credit transfer services, changes in student data due to moving address and cell phone number and others, 5) library services. The institution provides various learning resources such as digital libraries including e-books, e-journals, dissertations, theses, research results, papers, and Principal Material Books. It also has a virtual reading room facility where students can access the main materials book or modules online in full-text form. In addition, the study program through the institution library has become a member of the State University Cooperation Forum or Higher Education Library Activity Forum in Indonesia. The institution also subscribes to several e-journals that can be accessed by students such as <http://www.proquest.com/ppdweb>, <http://infotrac.galegroup.com/itweb/idut>, <http://gdlhud.indonesiadln.org/> and facilities provided by DIKTI through the address <http://garuda.dikti.go.id>. The digital library services owned by institutions are e-book and e-journal. The e-book such as iG Library, Ebrary, SpringerLink, Ebsco Host, Cengage Learning, Wiley Online Library, Cambridge University Press, IADL International Association of Distance Learning. The e-journal such as SpringerLink, Ebsco Host, Cengage Learning, Wiley Online Library, IADL International Association of Distance Learning, EURODL European Journal of Open, Distance and E-Learning, MERLOT Journal of Online Learning and Teaching, AAOU Asian Association of Open Universities

The institution, cooperates with various institutions in carrying out its programs, including several government banks. Cooperation with institutional banks is generally related to education cost services through banking facilities and employee income payment services. Besides that with PT. Pos Indonesia (Persero) related to the utilization of letter and goods services in supporting the implementation of distance education programs. While the Karunika cooperative is related to the UT module sales service via the online bookstore (TBO).

CONCLUSION

As indicated in the beginning, some constraints have appeared while coping with the processes of open and distances system, especially those dealing with chemistry education. An abstract characteristic of chemistry requires learning that occurs with visual presentation assistants combined with hands-on practicums. With open and widespread student domiciles, Program study coordination with students and instructors becomes demanding. Students are to collectively conduct their practicum in a designated lab. The solution to this issue is developing partnerships with local universities whose Lab is available for the students to conduct practicums, and so are with the instructors. In addition, there are several courses that require a practicum. While the whereabouts of students are scattered in various regions. The strategy of the study program is to establish partnerships or cooperation with universities or schools in each province that have adequate chemistry laboratories. Another obstacle is that students generally do not register for practicum courses in the same semester, sometimes even only one or two students register. This resulted in a high cost of practicum implementation. While other common obstacles are internet network constraints in some areas, especially remote areas, while students are scattered in urban and rural areas. The effort made by students is to approach areas that can reach the network to be able to access learning and information delivered by the institution.

Providing distance education requires proper preparation and management to achieve success. The success of organizing an educational program can be seen as a necessity for an institution which is reflected in its learning and management programs. In distance education, a set of criteria is described that needs to be provided so that students who take part in the program can study as expected. With the development of information technology, many people, including teachers who want to improve their academic qualifications, strive to attend various forms of education including distance education. Therefore, the Chemistry Education Program needs to continuously strive to improve its programs including providing and delivering its learning program, the availability and accessibility for teaching materials, academic services, and administrative services.

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