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CYBER SECURITY AND DIGITAL FORENSICS AS A PREVENTIVE AND REPRESSIVE STEP TO OVERCOME CHEATING IN ONLINE TUTORIALS

M Jeffri Arlinandes Chandra¹, Purwaningdyah Murti Wahyuni², Herry Novrianda³
Universitas Terbuka, Indonesia

Abstract

The rapid development and utilization of information technology answers the problems regarding distance learning. Open universities have online tutorial services to reach students who are reserved in learning but do not want to be limited by distance and time. The weakness of online tutorials is that they cannot monitor users in interacting online, so they are prone to cheating. Cyber security and digital forensics are ways farther than fraud prevention and countermeasures in online tutorials, when a lot of credibility fraud in a university that conducts learning through online media is at stake. The method used in this study is empirical research which directly takes samples of fraud cases that have occurred at the Universitas Terbuka, then what steps are taken and then resolved. Cyber security is a technology, process and practice designed to protect networks, computers, programs and data from unauthorized attacks, damage or access. The purpose of Cyber Security is to protect information assets from being used by unauthorized people. If there is still data leakage, digital forensics will complete identifying the recorded digital footprint and can be seen by using technology. The digital trace results can be in the form of data such as sound data, images, text and video data which are then analysed by data that have not been structured. So that it can be used as authentic data for decision making from cheating on the online tutorial. Online tutorials can be implemented well and get good results if done well, so a good system is also needed, that is to say prevention through Cyber Security and Countermeasures through digital forensics.

Keywords: Technology, Cyber Security, Digital Forensics, Online Tutorial.

Introduction

The progress of Information and Communication Technology, especially the internet, has a domino effect for all circles and other industrial developments. These developments also have an impact and require educational institutions to innovate in providing learning services. Private Universities (PTS) and State Universities (PTN) both at home and abroad compete in utilizing Information and Communication Technology (ICT) realized in a system called electronic university (e-University) which aims to support the implementation of education, so university can provide better information services to its community, both inside and outside the university via the internet. Other educational services that can be implemented through internet facilities are by providing lecture material online that can be accessed by anyone and at any time. Along with the need for more effective and efficient methods and concepts of learning, the use of information technology for education is inevitable. The concept which was later known as e-Learning brought the effect of the process of transforming conventional education into digital form, both the contents and the system⁴.

Universitas Terbuka is the only university in Indonesia that applies lectures openly and remotely, using learning services that range from Face-to-face meetings, Online learning (E-Learning) and Webinar (E-Seminar). One of the prima donna of learning models in open universities is the use of advances in educational technology systems through e-Learning, online learning aims to reach students who have limited access, time and costs in undergoing lectures in general. E-Learning can be accessed all the time as long as it is connected to the internet and the pre-registration time for lectures is opened, using the Modular Object-Oriented Dynamic Learning Environment (MOODLE), UT e-Learning can be accessed either through a browser or iOS or Android devices. To do the students just enter the application and do the initiation both discussion and assignment, then get the value of an online tutor with feedback that can be discussed together. Of course, besides the advantages there are also shortcomings in learning systems through e-Learning, which are vulnerable to misuse of users and passwords by people who do not have rights either intentionally or unintentionally (hackers), both online tutors and students. As an example of an identity loan to become an online tutor that occurs in Bengkulu with the mode of borrowing complete requirements to become a tutor, then registered and after getting the class processed by an actor who does not necessarily have competence in managing the class then when the class ends and the honorarium is transferred identity actors and borrowers to share the honorarium. Then cheating and violations also occur in students such as giving other people to do online tutorial classes to deeds that are not commendable by students to tutors such as saying rude, saying dirty, berating, cursing and activities that violate norms that apply in the community at large. The activity is certainly very detrimental and damaging to the image of an open university as a government institution that conducts distance education that has quality and integrity, such as the values adopted by all academics in Universitas Terbuka. Of course, there must be precautionary measures (Preventive) and countermeasures (Repressive) to overcome these things.

A. Results and Discussion

The development of information technology requires that each individual can answer every need and challenge of the global world today including the world of education. Facing this progress there are at least two aspects in the education

system that must change according to the new paradigm that applies. The first is in terms of learning methods (using multi-directional sources) and the second is in terms of institutional management. One form of a new paradigm in the education system is in the form of e-Learning.

The application of e-Learning for the needs of the course is absolutely necessary. Because if the instructor (instructor) cannot be present in a learning then Moodle-based e-Learning is expected to be an alternative to facilitate learning, because the entire teaching material, discussion, consultation, assignment, TOEFL training, TOEFL test, and other learning activities can be fully delivered or done through e-Learning.

Various forms of utilization of information technology to support teaching and learning activities, as follows⁵:

- a) *Web Course*, namely the use of information technology for educational purposes, where all teaching materials, discussions, assignment consultations, exercises, and examinations are fully delivered via the internet. Students and teachers are completely separate and there is no need for face to face.
- b) *Web Centric Course*, where some teaching materials, discussions, consultations, assignments, and exercises are delivered via the internet; while the exam and some consultations, discussions and exercises are conducted face to face.
- c) *Web Enhanced Course*, namely the use of the internet for education, to support the improvement of the quality of face-to-face learning activities in class.

Of course, the use of technology can be combined with the desired needs, as in Blended learning which is a learning approach that integrates face-to-face learning and distance learning by utilizing online learning resources in diverse choices⁶. Blended learning is a combination of learning and face-to-face learning. Completion of learning tasks by students can be done in class and outside the classroom independently. Thus the student learning experience is broadening because students use various sources or various media or both media in the classroom and media that are accessed from online media, so learning becomes increasingly attractive for students. Universitas Terbuka as an Open University is one of the universities that implements blended learning that provides online and face-to-face learning services, but it is undeniable that online learning makes students more active in finding information and learning resources that are diverse such as through the internet, radio and television; and utilizing other learning resources such as computer-assisted teaching materials and audio / video programs, OER and MOOC. Through these learning services, UT students are expected to be able to apply learning independently which requires students to learn and on their own initiative or initiative. Self-study can be done alone or in groups, both in study groups and in tutorial groups. At this time, with the mandatory 3 of the courses taken in each semester to be conducted online, students are required to be able to attend an online class prepared by Universitas Terbuka as a learning service and boost the final score by 30%. Of course in the implementation of the online lecture there are distinct advantages and disadvantages. The advantages of using e-Learning for online distance learning, namely⁷:

1. Increase learning interactivity (enhance interactivity) Online distance learning that is carefully designed and implemented can increase the level of learning interactions between learners with learning material, learners with instructors, and between learners and other learners.
2. Facilitate learning interactions from anywhere and at any time (time and place flexibility) Learners can interact with learning resources at any time according to their time availability and wherever they are, because learning resources are packaged electronically and available to be accessed by learners through the system online-learning.
3. Has a wider range (potential to reach a global audience). Online distance learning is flexible in terms of time and place, making the number of learners that can be reached by learning activities through online learning more and more widely open to anyone who needs it.
4. Facilitate the improvement and storage of learning materials (easy updating of content as well as archivable capabilities). The facilities available in the technology of online learning and various software that continues to grow help facilitate the development of electronic learning material.

In addition to the many benefits, e-Learning using the internet for distance learning has certain disadvantages or weaknesses, namely⁸:

- a) The physical separation between the instructor and the learner, thus making the interaction between the teacher and the learner or learner with other learners become non-existent or lacking. This lack of interaction makes the teacher less familiar or familiar with learners who can hinder or interfere with the success of the learning process.
- b) Technology is an important part of education, but if it is more focused on aspects of technology and not on the aspects of education, there is a tendency to pay more attention to technical or business / commercial aspects, and ignore aspects of education to change academic, behavioural, attitudinal, social, or skill abilities from learners.
- c) The process of learning and teaching tends towards training rather than education which

emphasizes more on the knowledge or psychomotor aspects and less attention to the effective aspects.

- d) Teachers are required to know and master the strategies, methods, or techniques of information and communication technology-based learning that are possible as long as conventional learners are under-mastered.
- e) The learning process through e-Learning uses internet services that require learners to learn independently to obtain knowledge or information by accessing it themselves to the internet and not relying on information from teachers.
- f) Weakness of the technical aspect that is not all learners can take advantage of internet facilities because there is no available or scarce computer with the internet. Moreover, not all places or educational institutions have internet network facilities available.
- g) The problem is the limited availability of software (software) which costs are still relatively expensive, so it is necessary to get the software at a cost that is not expensive, for example by collaborating with computer providers or related parties and interested in education.
- h) If the computer facilities with the internet are fully available and there are no obstacles, the problem will arise because of lack of knowledge and ability or skills (skills and knowledge) to operate the computer and utilize the internet optimally. For this reason, human resources are needed, such as teachers who are skilled at utilizing computers and the internet optimally in learning techniques that use computers to get as much useful knowledge and information as possible.
- i) Universitas Terbuka's students are very diverse with a variety of occupational backgrounds, cultures, ages and so on because the open concept of new university student admissions is in the process of admitting new students, Universitas Terbuka (UT) does not implement a system of selection and limits on the age and year of graduation of diplomas such as on campuses in general. It's just that for the teacher must have a Unique Number of Educators and Education Personnel (NUPTK)9, so there will certainly be many obstacles to distance learning.

The diversity of UT's students certainly creates complex problems, for example in the age with the current ratio of students registering reaching 292,465 people with the following distribution¹⁰:

Age Group	Amount	Percentage
< 25 Years	113.527	38,82%
25 – 34 Years	104.093	35.39 %
35 – 39 Years	35.257	12.06 %
40 – 44 Years	18.567	6.35 %
>44 Years	21.021	7.19 %
Total	292.465	100 %

Of course, students on average > 40 years old (Generation X) will have difficulty accessing online tutorials due to limited ability or skills (skills and knowledge) to access the internet so that they tend to be more conventional (Face to Face) or more extreme due to limited skills accessing online then another person (jockey) uses:

1. For those who are serious and want graduation according to the schedule, there will be delegation of online tutorials.
2. Just need a diploma as a job requirement or a prerequisite for occupying a certain position.
3. Financial that has been established but wants to graduate quickly.
4. Cannot take tutorial because of busy work and others

These things allow for the occurrence of jockeys and therefore need security and socialization regarding the rules that apply at UT and the sanctions given. Not only for student jockeys, of course, it also needs to be arranged about tutorial tutors jockeys (teaching assistants) with strict sanctions. Enforcement of these frauds must be made a multiple security system so that people who use it are indeed people who have the right and obligation to run the tutorial. If prevention is maximal but fraud is still occurring, a system is also needed to identify fraud that occurs so that when sanctions are imposed, the organizers (UT) have sufficient evidence to determine what fair sanction in upholding the rules is.

a. Preventive cheating in online tutorials (eLearning))

The rapid development of information technology and the widespread use of e-Learning as a learning media today must certainly be secured from irresponsible parties (hackers) and also the security of jockey practices, so that there is a competent and well-targeted education. The steps that can be taken in securing the account are:

1. Safeguarding accounts from irresponsible parties (*Hacker*).
 - a) Trying not to save the password in the browser that you are using because if it is not issued "log out" then it will be stored in the application and at any time it can be used by others to open and change your account password.
 - b) Use of Unique and Strong Passwords that are a combination of letters and numbers with a combination of upper and lower case letters will certainly make it difficult for the company to access your account.
 - c) Protect against Messages and suspicious content because hackers can use e-mail, SMS, phone calls, and pages to pretend to be an institution, family member, or colleague. Do not give your password to anyone, do not reply to emails, SMS, instant messages, pages, or suspicious phone calls that ask for your personal or financial information, and do not click on links in e-mails, messages, pages or pop-ups from sites or senders cannot be trusted.
 - d) Development of incoming verification or through the 2 steps of the UT e-learning application, namely in entering the e-learning application so that it helps prevent hackers from accessing your account, even if your password is stolen. Only people who have access to your password and mobile number (or security key) can enter your account.
2. Account Security from Account Abuse (Jockey)
 - a) Use of the Face Lock Method in verifying the steps in and out of the e-learning application because it will ensure that the accessor is the right person according to the data server that is owned by the central security.
 - b) The development of the live chat / video chat method that is like Instagram or Facebook is used, so when the tutor is online, students can do video chat together with other friends who can use the live chat feature to split the chat video so that it will presenting an online atmosphere that feels in class and is certainly more relaxed, besides that it will minimize cheating such as online tutors (jockeys) as tutors because there are direct and similar interactions as well as students to be more active and able to communicate with tutors.

Preventive Violation of Norms in Online Tutorials (eLearning)

The broad definition of law can mean about regulations in the form of norms and sanctions that are made with the aim of regulating human behaviour, maintaining order, justice, preventing the occurrence of chaos. The law is formed based on norms and rules that apply in whole and agreed upon by a group to be applied in a certain circle, for example in ethics and behaviour of civil servants regulated in Government Regulation Number 53 of 2016 concerning Discipline of Civil Servants, in the Ministry of Research, Technology and Higher Education there is a Ministerial Regulation (PERMEN) RISTEKDIKTI No. 54 of 2016 concerning the values, work culture, and code of ethics of employees in the research, technology, and higher education ministries then in the Universitas Terbuka's environment are contained in the Universitas Terbuka statutes and stated in the Rector's Decree Universitas Terbuka No. 176/2010 concerning the Code of Ethics in the Universitas Terbuka Environment. All of these are rules that must be respected and obeyed by each member of the institution.

The principle of legality of a principle which requires that in a law enforcement must first have clear rules / laws and then be able to apply sanctions and norms to him, regardless of someone who knows / does not know about the rules, then sanctions must be imposed on him if he violates the rules that is. Law as a rule is certainly not just a punishment if a violation occurs but must also be a deterrent / reminder when people want to act in violation of established rules. For example, driving on a highway is certainly regulated in Law Number 22 of 2009 concerning Road Traffic and Transportation, but in the implementation in the field, traffic signs (Verboden) which are installed provide the ease of carrying out actions on the highway.

Online tutorial which is a learning service that is used to interact between students and online tutors through the tutorial page provided. The tutorial page is a depiction of classes in the real world that should be used appropriately and properly. Many cases occur on the tutorial page (independent discussion / task), namely Plagiarism. Plagiarism is an act intentionally or unintentionally in obtaining or trying to obtain credit or value for a scientific work, by quoting part or all of the scientific work of another party that is recognized as a scientific work, without expressing the source appropriately and adequately¹¹. On the plagiarism tutorial page occurs when students respond to discussions, often students copy the answers of previous friends or copy answers directly from the internet without giving notes that they can be from the internet page. In the academic world these deeds are prohibited so that there is a need for appropriate penalties for these acts which of course the rules of the game must be socialized in advance regarding the sanctions. Not only that harassment and unpleasant actions through words typed through e-learning must be clearly regulated because each word has a broad meaning and may occur in multiple interpretations, and the event is very likely to occur in a virtual class such as e-learning therefore it is necessary to have rules that are made and continue to be reminded when going to access the e-learning activities. If necessary in the form of approval in accessing the e-learning page so

that every accessor who wants to access it certainly needs to approve or trigger the page to enter and continue the e-learning activity. Following is the form of the approval sheet that can be used in the series of steps to enter the online tutorial:

WELCOME TO TUTORIAL ONLINE (E-LEARNING) UNIVERSITAS TERBUKA

The following are the rules that you must obey in accessing this service:

3. For Online Tutors

- a) Make sure that you are the **ONE WHO RESERVES** in accessing this service, if later it is proven that you are not an entitled person then Universitas Terbuka will provide Sanctions and Punishment in accordance with the applicable Rules at Universitas Terbuka.
- b) Use polite language and good at greeting students and responding to student discussions.
- c) Give Objective Values to students in conducting assessments.
- d) All actions that violate the rules, norms, applicable laws will be processed and sanctioned by Universitas Terbuka in order to maintain the good name of the institution.

4. For Students of Online Tutorial

- a) Make sure that you are the **ONE WHO RESERVES** in accessing this service, if proven you are a **JOCKEY** then the assessment of this course will be given an **"E"** score.
- b) Use polite language and good at asking **TUTOR** and respond to discussions during the discussion.
- c) Avoid **"PLAGIARISM"** activities such as copy paste from the internet or answers from previous friends both in **Mandatory Discussions and Tasks**. If it is proven, the obligatory **Discussion and Task** value will be given a score of **"0"**.
- d) All actions that violate the rules, norms, applicable laws will be processed and sanctioned by Universitas Terbuka in order to maintain the good name of the institution.

b. Combating Fraud in Online Tutorial (eLearning)

The use of the internet and various methods or methods of break-in of the system must be dealt with, because if there is a violation or fraud in the operation of online tutorials / e-learning, it can be handled properly through searching for digitalized data so that later it can be legally concluded and proven and real violations that occur.

Digital forensics / Digital forensics aims to secure and analyse digital evidence, as well as obtain objective facts from an event or security breach of the information system in fraud that occurs in e-learning. Digital forensics includes the investigation and discovery of the content of digital devices that are used to find out the facts of account misuse. Digital forensics is needed because usually the data on the target device is locked, deleted, or hidden, but in digital forensics carried out in tracing fraud in e-learning, the emphasis is on account recovery and the search for related evidence of fraud that occurs in e-learning like student jockeys and tutor jockeys.

Digital forensic results can be in the form of the practice of collecting, analysing, and reporting digital data which can then be used to confirm relationships between suspects and certain cases, confirm alibis or statements, to understand intentions, identify sources or authenticate documents. There are several stages in digital forensics, namely:

- a) Data collection aims to identify various resources that are considered important and how all data can be collected properly. Data collection is the first step in conducting a forensic process to identify sources that are considered potential to be used as evidence, and explain the steps needed to collect data. Data collection in this case includes several activities such as the following: Identification, Labelling, Recording, Obtaining data.
- b) Testing is the process of collecting data then by carrying out tests including assessing and extracting relevant pieces of information from the data collected, this stage involves bypassing or minimizing operating system features and application systems that will obscure data, such as compression, encryption and access control mechanism.
- c) The analysis used to provide quality conclusions must be based on the availability of a number of data or even vice versa, concluding that "there is no conclusion". This is very possible. This analytical task includes a variety of activities, such as identification of users or people outside the user who are indirectly involved, location, device, incidence, and consider how all the components are connected to each other to get final conclusions¹².

To see cheating in the implementation of online tutorials through forensic data can be seen from various aspects that might occur so that conclusions can be drawn and in-depth research is carried out, namely:

- a) Tracking the address of the IP address of the device used
Basically e-Learning users both tutors and students who are identified as cheating will tend to use the same IP address or the same device in accessing the e-learning. A tutor or student will usually delegate to a close person / person who is considered competent in running / working on the e-learning so that the tenders who work are also a tutor or a student because they already have experience, so that the device (IP Address) can be identified same as logging in and out in a relatively concurrent time, jockeys can occur and must be identified more deeply to prove and determine sanctions given.
- b) The development of an online proctoring system that supervises students and tutors who are identified as cheating so that they can be seen through data that is given either photos or so on so that someone who has access to the service is entitled or not.
- c) Development of Video conference media that can be used by supervisors, students and tutors not only to ensure that people who have the right to access can also be used as a means to revive the class through online discussions.

B. Conclusion

The development of educational technology by presenting e-learning as a learning solution without having to be in the classroom is a very interesting answer for people who want to continue their studies but have limited access to reach face-to-face classes for various reasons. Online tutorials have the advantage of running them such as Increasing interaction interactivity, facilitating learning interactions from where and at any time (time and place flexibility), having wider reach (potential to reach a global audience) and simplifying and storing learning materials (However, online learning also has drawbacks, among others, interactions between instructors and learners or learners with other learners being non-existent or lacking, tend to assess knowledge or psychomotor aspects and pay less attention to affective aspects, then from a technical aspect, not all learners can take advantage of internet facilities because there is no or scarce computer with the internet and not all places or educational institutions have internet network facilities available. These deficiencies have an impact on the potential for fraud that will occur and therefore there needs to be prevention and countermeasures for online tutorials, namely securing accounts from unauthorized parties (hackers) such as trying not to store passwords in the browser, using unique and powerful passwords, protecting the password, Messages and suspicious content.

In addition, Universitas Terbuka, to maintain campus credibility, must ensure that tutors and students are registered tutors and students with the Use of Face Lock Method in verifying steps in and out of e-learning applications and Development of live chat / video chat methods like Instagram or Facebook uses so the interaction gets more alive. Then no less important is the Prevention of Violations in Tutorial Online (e-Learning) because the concept of online classes is the same as face-to-face classes, there must be notification and socialization when violating when the tutor or student wants to access the service. Countermeasures are the last way out if fraud occurs and the perpetrators must be given strict sanctions by promoting authentic evidence in digital forensic searches.

¹ lecturer in law studies, concentration of constitutional law

² lecturer in legal science study program, concentration in business law

³ lecturer in study program management, business management concentration

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Virtual University of Pakistan

M.A Jinnah Campus, Defence Road, Off Raiwind Road,
Lahore. Ph: +92 42 99203897 Fax: +92 42 99200604, 99202174

