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USER BEHAVIOR E-LEARNING ANALYSIS

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User Behavior E-Learning Analysis

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ABSTRACT

This study aimed to analyze the behavior of users of e-learning Makassar State University, which has implemented since 2006 and there has been no comprehensive study before to analyze user behavior at the university level. User behavior analysis gives a comprehensive overview of learning activities during the use of e-learning. It can be used as an evaluation and prediction is mainly related to level of ability, interests, and performance of learners, and also becoming foundation for the development of e-learning Makassar State University. Data collection through technical documentation, observation, and interviews. Documentation logs were analyzed using the student record log data mining clustering approach is then interpreted descriptively. The results showed that 1) the user's device UNM e-learning can be seen from this type of device, browser, screen resolution, and input methods, based on the type consisting of phones, tablets, and desktops. The most widely used browsers are Mozilla Firefox, and the most predominant screen resolution is 1366x768 pixels. Mode input is dominated by touchscreen, 2) time users access e-learning fluctuated but showed a rise in the early morning at 01.00 pm and at midday at 12.00 pm, 3) By the day, the activity is almost evenly on all days, except day Friday, 4) The duration of access is very short, average 10 seconds per session, while the location of the dominant accessed from outside the campus, while on campus only eleven percent.

Keywords: user behavior, e-learning

A. INTRODUCTION

In 2015, Indonesia has become the country with the growth of e-learning industry the 8th largest in the world (Pappas, 2015). This is supported by "the development of the Internet in Indonesia increased 100% each year" (Effendi, 2005: 4) and also the growth of smartphone users in Indonesia from year to year grew 33% since 2013, with the intensity of using their device average of 129 minutes per day (Vserv, 2015). The growth of e-learning so rapidly must be balanced with an increase in learning strategies that were developed e-learning is not only technologically advanced, but also reliable in achieving learning goals. Implementation of e-learning in higher education according to Haughey can be applied to 3 forms of possibility and it was web course, web centric course, and web enhanced course "(Suyanto, 2005: 4).

E-learning is a form of implementation of learning which is learner-centered, and because of that, the characteristics of the learner becomes an important component of which is taken into account in its implementation. Knowing the characteristics of learners in detail will provide a guarantee that e-learning has been applied in accordance with the needs of learners and provide maximum learning experience. One way to determine the characteristics of the learner is to analyze the behavior of users of e-learning (Hartoto, 2014). The study New Media Consortium predicts that online learning behavioral analysis will be the trend of e-learning in the future (Jonshon, 2014). Analysis of the behavior in the context of learning can provide a comprehensive view learning activities undertaken during the use of e-learning. Benefit analysis of this behavior include 1) Improving the learning experience of learners, 2) As the evaluation and prediction of the level of ability, interests, and performance of learners 3) Improving the efficiency and effectiveness of the use of e-learning 4) Improving the Learning Management

System (LMS) used. 5) Giving information for institutions policy, and 6) As a means of monitoring and evaluation of learning activities (Elies, 2011; Van Harmelenm, 2012; Siemens, 2014; Pappas, 2014).

Based on initial research by the author, Makassar State University have applied an e-learning since 2006 and until May 2015, already has 758 online classes. Since its implementation till now, the research has not been done related to user behavior. Without user behavior data, e-learning applied will not be optimal because it only focuses on technological aspects, but less attention to pedagogic aspects. In this study, the authors focused on the behavior of users of e-learning at the University of Makassar that the results can be used as a reference for the development, utilization, and regulation on the implementation of e-learning at the University of Makassar.

Ningtyas (2008: 513) analyze the behavior of users of e-learning based on "1) access time trends, 2) activity (action) is most often performed, and 3) the mean time". For activities, Romero (2007) divides into three types of activity of the material, feedback and activity against fellow users of e-learning. Munir (2009: 58) states that "human activity in the use of computer equipment can be identified through the behavioral intention to use and actual system usage" .Behavioral intention to use is the behavior of users of information systems to keep using a technology. One can predict the level of use of the attitude of attention to technology, such as the tendency to always perform the activities in e-learning. The second is the actual system usage, that is the real situation in the use of information systems which form of measurement can be seen from the frequency and duration of use of technology.

Based on the above background, research problem is formulated as follows: "How is the behavior of users of e-learning Makassar State Univeristy review of aspects of the access time, duration of access, device access, and activities?". The purpose is to describe the behavior of users of e-learning Makassar State Univeristy review of aspects of the access time, duration of access, device access, and activities.

B. METHODS

The approach used in this study is a qualitative research approach. This research was conducted at the State University of Makassar , Jl. AP Pettarani, Makassar. Source of data in this study is the log records the user's e-learning Makassar State University which is located <http://lms.unm.ac.id> within the period from January to October 2015 and interviews with students, lecturers, and administrator of e learning Makassar State University. Data collection techniques are documentation, observation, and interviews, which then analyzed descriptively qualitative.

C. RESULTS AND DISCUSSION

1. Research

There are 2,179,361 log data in e-learning portal server Makassar State University. The data then filtered by time period 1 January to 31 October 2015 and remain 135 588 records. Macro data processing by using Microsoft Excel, supplemented with the results of Google Analytics report.

User access devices that can be identified include the category of devices, the browser used, screen resolution, and color depth of the access device.

Table 1. Devices Category of accessing e-learning portal

No	Devices Category	Session	Percentage	Duration Average
1	Phone	26.053	40.00 %	6.60 menit
2	Tablet	10.309	36.73 %	7.58 menit
3	Desktop	874	33.38 %	12.96 menit

Based on the data, known that users of e-learning is dominated by mobile devices, which amounted to 76.73% (phones and tablets). But the trend desktop users (laptops and PCs) longer access e-learning than those who use mobile devices. While the most widely used browsers are Mozilla Firefox (46.90%). More details are described in the following table.

Table 2. The Browser which is used to access e-learning

No	Browser	Session	Percentage
1	Firefox	17.463	46.90 %
2	Chrome	12.135	32.59 %
3	Android Browser	2.144	5.76 %
4	Opera Mini	1.749	4.70 %
5	UC Browser	1.526	4.10 %
6	Safari	663	1.78 %
7	BlackBerry	571	1.53 %
8	Internet Explorer	333	0.89 %
9	Opera	328	0.88 %
10	S40 Ovi Browser	119	0.32 %
11	Others (10 browser)	204	0.55 %

Browsers type can also indicate by the type of device , such as Android browser, Opera Mini, blackberry, and of course the browser ovi found on smartphones. While firefox, chrome, safari, internet explorer, and opera is a popular browser on the device desktop.

The screen resolution contained in the user's device is quite varied, it also shows the diversity of the type of device used. However, the most predominant screen resolution is 1366x768 pixels are used, which reached 39.03%. The screen resolution falls within the category of High Definition (HD) with a ratio of ~ 16: 9. Similar research is also demonstrated by W3School showing that a resolution of 1366x768 pixels is used by 33% of all computer users (W3School, 2015).

Table 3. The Screen Resolution of Access Device e-learnin

No	Screen Resolution	Session	Percentage
1	1366x768	14534	39.03%
2	1024x600	4390	11.79%
3	1280x1024	1957	5.26%
4	320x534	1727	4.64%
5	480x800	1415	3.80%
6	Lainnya (di bawah 3%)	13213	35.48%

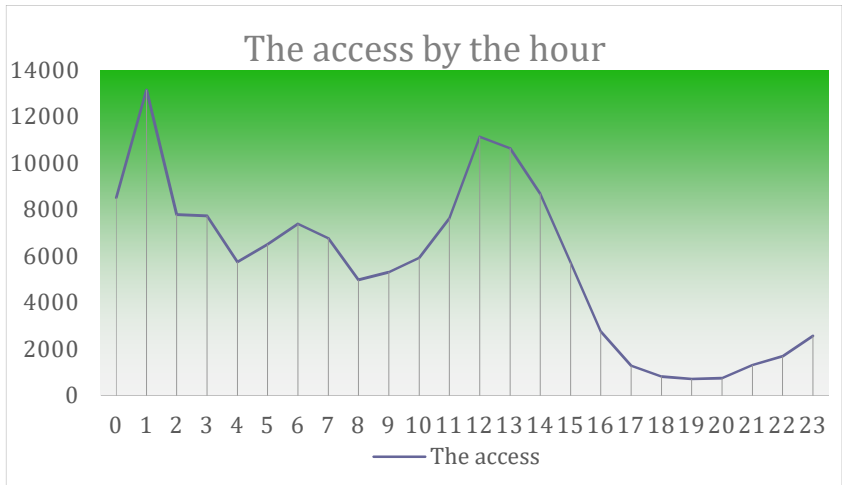
Specifically on mobile devices, there are several types of input. Including are the popular touchscreen tablet devices and smartphones, the trackpad and the trackball on smartphones such as BlackBerry RIM output. Users of e-learning Makassar State University dominated touchscreen that is 71.07% of the overall mobile device being used.

Table 4. Input Devices Mobile Phones

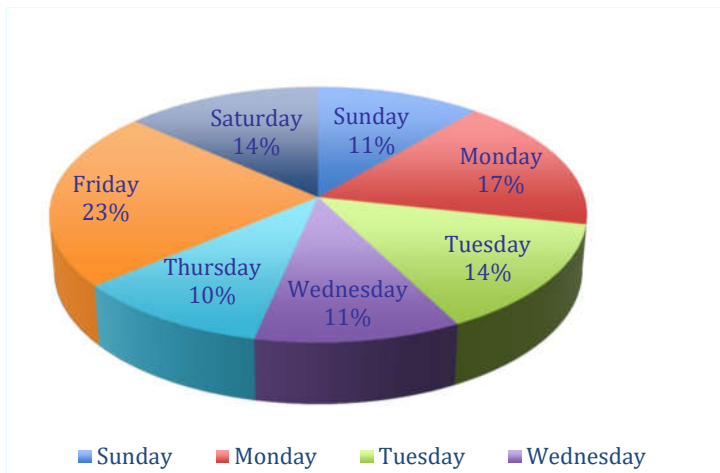
No	Input Mobile Phones	Session	Percentage
1	Touchscreen	7948	71.07%
2	Tidak teridentifikasi	3186	28.49%
3	Trackpad	27	0.24%
4	Trackball	19	0.17%
5	Joystick	3	0.03%

While that, access time of e-learning is divided into access based on hours and days. Access by month is not shown because it is less relevant for this study. From the data processing logs, data showed that the access of the highest at about 01.00 pm dawn that as many as 13 53 activity. A rising trend seen in at 08.00 pm with a peak of activity at midday at 12.00 pm, after the decline of activity until late afternoon and rose again at night (Figure 1).

While the review is based day (Figure 2) shows that users of e-learning UNM almost evenly spread in all day, except Friday, which reached 23%, ie 30 685 activity. There is no decrease in the activity of users of e-learning significant although on holidays (Saturday and Sunday), even on the day of the holiday activities higher than on Thursday.



Picture 1. Graph the access by the hour



Picture 2. User Activity on the E-learning portal UNM by Day

Duration users access e-learning portal is very short, averaging 10 seconds per session. This activity reached 27.83%. Accessing e-learning, 10 seconds is only used to log in, check the task, then logout. Based on observations in the field, users often download material presented later learned offline in order to save quotas owned internet and more comfortable. Another reason stated is downloading materials in advance later studied at different times. Examples student files downloaded material on campus, then studied at home offline.

Table 5. Duration User Session e-learning

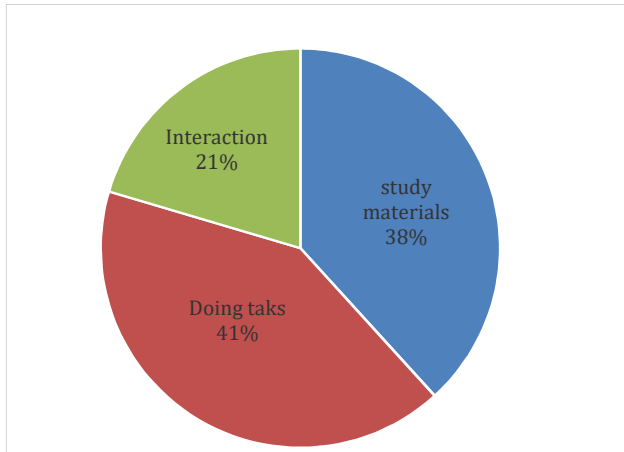
No	Duration	Session	Percentage
1	0-10 second	10362	27.83%
2	11-30 second	1287	3.46%
3	31-60 second	2027	5.44%
4	61-180 second	5430	14.58%
5	181-600 second	7363	19.77%
6	601-1800 second	6514	17.49%
7	1801+ second	4253	11.42%

Location access of e-learning can be determined based on the IP address of the device used. IP addresses are entered in the block local IP and public IP access from a categorized UNM campus. In addition to these two IP blocks, put in a category of off-campus access.

Table 6. Location The access E-learning

No	Location The access E-learning	Session	Percentage
1	Outside UNM	121272	89%
2	UNM	1.4301	11%

Based on the table above, e-learning Makassar State University turned out to be more accessible from outside the campus rather than access from campus. When examined further, there are 1,148 login activity conducted from within the campus network and 8,757 times the users login from outside the campus. Activities performed by users of e-learning has been described in Chapter 2 and can be grouped based on the model of ADC models Horton, R2D2 model (2008) and Zank, and PI4 Caladine models.



Picture 3. Activity of E-learning User

User activity are grouped into three major groups namely the activity of as many as 49.404 study materials include book access activities, calendar, course, folders, glossary, label, library, iti, notes, page, resource, url. While the activities of the task as much as 53.372 to assign details, blogs, choice, lessons, quizzes, wiki, and workshops. And the third activity of the user is to communicate with other users as much as 26.380 includes chat (online discussions), forums (discussion asynchronous in discussion forums), message (send private messages to other users), user (see other users' profiles, edit and update profile)

2. Discussion

Results of the e-learning user behavior Makassar State University based devices used to access, time of access, duration of access, access locations, and activities conducted showed that users of e-learning is more flexible when determining the time and location of their learning. This is supported by the dominance of the use of mobile devices that make it easier for them to learn anywhere and anytime. Changing patterns of this study need to be considered by learners and administrator of e-learning so that they are able to create e-learning ecosystem that is more personal and flexible.

a. User devices

Devices that apply by the e-learning user University of Makassar vary. Each device has a relatively different way of working with each other. Surely it would need different treatment. E-learning technology should be able to accommodate these differences. The dominance of the use of mobile devices to access e-learning requires learners to design and develop learning materials are short, solid, and clear. Screen mobile devices is smaller than most desktop, so that if the material is arranged in length will be difficult for users to read and tends to get bored. Mobile device users prefer to read headlines than the overall content. By him, preparation of materials needed points in presenting the material. In addition, multimedia elements need attention, especially in terms of compatibility because not all multimedia formats can be run on mobile devices. Learners need support applications added to run the file. This is supported by the G Chute (2003) in which e-learning must support a variety of formats and how to use.

Types of user devices is also used as a reference for administrator of e-learning to make adjustments for the learning management system used to be more adaptive. E-learning interface must be designed to support mobile display because more users are using mobile devices (smartphones and tablets) rather than the desktop. Input Mode also be adjusted for users of e-learning Makassar State University more input through touchscreen, for example by extending the navigation icons instead of navigating in text form.

Interface compatibility testing and e-learning should be referred to the device most commonly used for the right target. In this case, the e-learning Makassar State University to be tested functionality and accessibility using android devices and Mozilla browsers with a resolution of 1366x768 pixels.

b. Access Time

A phenomenon that occurs on the user's e-learning Makassar State University is quite interesting, as the activity is mostly done at midnight, while at a time when tuition is decreasing. This proves that the e-learning really create flexible learning, especially in terms of time. Learner does not require a special time for accessing e-learning but in an online discussion. Thus, learners can freely access e-learning in accordance with the pattern of learning and free time they have. Each learner has different time from each other. E-learning has managed to accommodate those needs.

One of the causes of increased traffic in the early morning access is due to the standard setting, the final time of collecting duties at 00.00 pm. Learners know that the cause of their delay task

execution can not collect tasks. New learners collect duties towards the end of the collection period of the task. For example, determined that the duty ends on 11 September 2015, the task was terminated on 11 September 2015 at 23.59. Learners can not collect tasks belatedly just a few seconds. So when the time shows at 00.00, meaning that the task had entered on 12 September 2015 and the time of collecting the task is over. This indicates a time management e-learning users Makassar State University unplanned.

For administrator of e-learning, e-learning access density can be used as input in managing network bandwidth. Priority is given bandwidth at congested times. However, because the e-learning more access outside office hours, it does not really affect the speed of access to other users within the campus environment.

c. Access Duration

In short, user time access can be reviewed on the assumption of positive and negative. On the positive, assumed to be efficient users to access e-learning. Users download the material for later offline study. This is usually done to anticipate the limitations of quotas owned internet users. This is in line with the dominant access from outside campus who use the Internet instead of paying free internet access on campus. On the negative assumptions, the short duration of the user's access e-learning may reflect the low participation and user interaction to online learning. Users are not deeply involved in learning activities such as study material and tasks online.

d. Access Location

The high location of the user's e-learning access from outside the campus shows that learning by using e-learning can be more flexible. This is in accordance with the opinion of the experts that e-learning is able to create a flexible learning experience (Handerson, 2003; Naidu, 2006; Lowirson, 2008; Horton, 2010). Flexible in this sense means it can be used anytime and anywhere (Pannen, 2005).

e. Activity

The complexity of the activities of users of e-learning is basically influenced by the design of learning designed by the learner. Each learning activities through e-learning learners who do follow the instructions given by the learner. Based on previous exposure that users of e-learning activity Makassar State University more on the activities of the task can be deduced that the lecturer has managed approach student centered. In addition, given also the opportunity to interact with fellow participants. This will create a conducive learning environment online.

Zer (2007) found that one of the advantages of online media are used in doing homework in the course of calculus, show increased learning achievement of learners, a positive attitude and a very good response to the online model of this task. Furthermore, studies conducted by Hughes and Hagie (2005), the participation of learners in online learning in the classroom shows the success of learners in relation to control the content of the subject matter and

showed that introducing asynchronous online discussion on individual self-improvement.

Other studies conducted by the Center for Applied Special Technology (CAST), which found that the use of the Internet as a medium of education showed positive results on learning outcomes of learners (Pavlik, 1996). While Tutty & Klein (2005), found that more than 90% of students have access to the internet on campus colleges and universities, and the observations of the Pew Internet & American Life (2007) found that almost 79% of the students agreed that using the internet has increased their college academic experience.

Many parents are worried because their children have lost motivation in learning. Especially in the era of globalization, as now, these types of games and facilities that attract very much is produced. So that children lose attention to the lesson, because in his mind still remember a game that has just been played. The type of game played kids today is very modern. Not a few children were still little has been able to operate equipment advanced technology, such as computers, mobile phones, and others. Often there parents can not afford to operate these tools than his son. Actually, this situation shows the progress of our nation's children, just how we steer the game into something useful technology and many functions in education.

Trend technology in the era of globalization has a significant influence on the world of education. Conventional learning model that has affected much of learning in Indonesia, there is still a perceived shortcomings, both in the learning process and learning outcomes. In addition to conventional learning model is centered on the students, this learning model also can not serve learners in

accordance with their individual needs, because the learning process is done in the classroom in a certain period of time.

Potential use of online learning for education increased steadily, learners can access not only textbooks, but can access material that is far from the location of the course. Teacher and learners can gather information together, distant and of libraries that can not be achieved in the whole world, with the most extensive information and potential for everyone.

Through this internet based learning, learners can provide lesson material via the internet facilities that can be accessed by learners at any time and anywhere. Learners also do not need to be always learning in class to obtain information about the material you want obtained. In fact, learners can develop their learning process by searching for references and information from other sources, so that learners insight into evolving.

The ability to access the internet is not only based on the ability to have a computer that can tap into the Internet network, but also required the skills of exploring the virtual world in order to obtain the information needed. If someone does not have the skills to surf the Internet then it will issue substantial funds and a long time to obtain the required information site. At this position the Internet to function closer someone with the necessary resources.

Munir (2009) argued that Internet-based learning is starting to feel the benefits and not only attended by learners, but also by employees, managers, directors, retirees, and housewives. While Lehman and the Lion (2009) in Nurhikmah (2011) suggests several reasons to consider in choosing an Internet-based learning rather than the conventional as follows.

- a. Learners can learn to be more active. Those who sit quietly and try to avoid participating in online classes, although it will not be seen by the teacher and other learners, but to get the value, a learner must participate (Chang & Smith, 2008).
- b. Learning involves learners with content through a variety of channels, learner-content interaction is the key. Interactions occur through discussion, games, simulations, research, and a variety of other means (Keeler & Horney, 2007).
- c. Learners and learners engage with each other. Discussion is open to all members and everyone involved can leave comments for each other (Richardson & Newby, 2006).
- d. All discussion can be stored forever. This allows learners to review or look back content, execution time and from anywhere.
- e. Online learning environment offering more freedom to express disagreement and to propose another question (Wenger, 1998).
- f. Learners receive the benefits of a learning community in which they can build a more vibrant discussion and have a lot more time (Collison, et al, 2000).
- g. Everyone can work at a time that is most convenient for them and in their environment in accordance with the conditions most conducive to their style of work.
- h. Through the use of technology, then all learning styles and needs / constraints can be met in an optimal learning environment so that all learners can thrive.
- i. Education is not bound by geography. Learners can learn in each institution to find what they need. Institutions can be a center of learning for them, whoever, and wherever the learner can teach (UNESCO, 2002).
- j. Gender, race, and other physical characteristics not seen in an online environment. In physical terms, the learners met in an online classroom can move freely and associate with different people with different sexes.

- k. Learners can learn from the best learners in the world without seeing residence learner. For that, learners can attend the best schools in the world, where learners live.
- l. Feedback meaningful, timely, and appropriate expectations (Tennessee Board of Regents, 2006).

It is inevitable that something new is bound to have positive and negative effects. Neither the change in learning from face to face (face to face) to the internet-based learning (without face-to-face) takes time and the process of socialization or adjustment of students. These changes include the old habits or patterns that have become routine in their daily learning to a new learning patterns.

As in the conventional learning, motivation and self-discipline of learners remains an important element of satisfaction and success in internet-based learning process. Other results can be seen that the internet-based learning system is affecting the level of learner satisfaction, but did not significantly affect the level of success of the learner. In addition, Internet-based learning system also brings significant improvements in the learning process.

Study the factors that affect the performance of internet-based learning needs to consider three dimensions which are the focus of the learners, institutions and e-learning (internet-based learning) itself. From the learner is required to make changes in terms of teaching and conveying knowledge. There are three main roles of a learner, the role cognitive, affective, and managerial. In the internet-based learning, learners still carry out a third of the play, but requires adaptation to maximize and exploit the potential offered by the e-learning. In terms of learners, they must be active to access the resources of the Internet, self-contained and disciplined in following

the internet-based learning mechanisms. In terms of institutional needs; (1) have the commitment; (2) investment crucial as understanding of cutting edge technology, structure incentives for teacher, training for teacher in designing the Internet-based learning materials are attractive, effective and efficient; and (3) to form a technical team responsible for the technical operation of the system in internet-based learning (Munir, 2009).

D. EPILOG

1. Conclusion

Based on the presentation in the previous chapter, we concluded as follows.

- a. E-learning user devices Makassar State University can be viewed from this type of device, browser, screen resolution, and input method. Based on the type consisting of phones, tablets, and desktops. The most widely used browser is Mozilla Firefox. The most predominant screen resolution is 1366x768 pixels are used, reaching. Input mode that dominates is through the touchscreen of the entire mobile device being used.
- b. Time users access e-learning fluctuated but showed an increase in the early hours of 01:00 pm and at 12:00 pm noon. By day, the activity is almost evenly distributed in all day, except Friday, which reached 30 685 activity.
- c. access duration of e-learning user portal is very short, averaging 10 seconds per session and the location of the access of e-learning most from outside the campus, which reached 89%.

2. Suggestion

As for the suggestion that the researcher can do with the results of this study are as follows.

- a. For leaders, are expected to make policy implementation of e-learning Makassar State University according to the rules for the implementation of online learning is good. User activity patterns can be used as a basic consideration that e-learning is now accepted by academicians of the State University of Makassar.
- b. For administrator of e-learning should develop an adaptive e-learning, especially in terms of accessibility. Add features that support the productive activities of users and improve infrastruktur e-learning. Business analytics can add features that can monitor user activity so that it can be used by lecturers to see the development of students. Administrator are advised to improve the quality of service given the number of students on campus access is very minimal.
- c. For lecturers, are expected to design and manage e-learning class by observing the pattern of activity of users of e-learning. Focus on pedagogis aspects rather than aspects of the technique. Develop teaching materials are adaptable to the diversity of student learning patterns.

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