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Adaptive E-Learning Model in Learning Personality Characters

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***Abstract*— E-learning provides flexibility and convenience that has never been seen before for electronic learners by breaking the limitations of space and time. The design concern of computer-based learning systems is how to accommodate individual differences in students during learning activities. Previous research has shown that adaptive e-learning systems can effectively overcome these individual differences and, consequently, allow guidance to be more directed through computer-aided instruction. Personality of students may be significant in understanding the differences in learning outcomes from using e-learning systems. The results show that personality traits that can be indicative of preferred learning styles, especially extravert / introverted personal character significantly influence learning activities in adaptive e-learning systems. An e-learning guideline is in accordance with the character of the learner personality.**

Keywords*: *adaptive e-learning, personality character, learning

I. INTRODUCTION

Educational institutions as organizers and printers of the nation's next generation have an important role to synchronize learning in the education system in Indonesia. Because 21st century learning students are faced with various developments in technology and information (ICT) so quickly that it brings new changes and demands.

Most computer-based learning systems are only able to convey the same content in, for the most part, predetermined sequences for all students, despite the fact that they may have very different perspectives and preferences in the learning domain [1].

The field that has an impact on the advancement of information and communication technology is the field of education. Many educational institutions use breakthrough learning processes through information and communication technology. By utilizing internet technology, space and time are no longer limiting students to learning. Learning material or material can be obtained by learners through various sources on the internet [2]. Learning lies in must include eight factors: storytelling, reflection, cognitive apprenticeship, collaboration, coaching, multiple practices, articulation of learning skills and technology [3]. E-learning is a broad field of work and attracts interest from various scientific disciplines such as psychology of education, computer science, information science, management, communication, and others [4]. E-learning in the last few decades has been able to change style, learning systems, research, as well as universities, academic, commercial and training [5], [6] [7], [8]. ATI training enhances student creativity in the e-learning environment [9], [10]. Emergence E-learning allows for virtual classrooms (virtual classes) and distance learning. The service is even more attractive with the application of e-mail, chat, video calls, video streaming, social networking, and so on. Complete application and sophisticated tools, enabling e-learning to be implemented at all levels of education. The technology must be utilized maximally given the ability to transmit information very quickly [11] e-Learning technology to improve the recording quantity and the quality of learning so students can read anywhere and anytime with sufficient high-quality streaming data [12].

As a result, many researchers criticize such a system as being inadequate in increasing learners' motivation for subject matter [13], suggesting that a better way to deal with this problem is to develop different learning materials to serve each student. However, to our knowledge, this has not been proven practical. In the use of e-learning it is necessary to pay attention to teachers and students. The longitudinal application of the model can monitor and improve pedagogical processes [14]. Teaching and learning must determine the implementation of technology tools and supporting facilities, not vice versa [15].

When new learning technologies develop to present learning material can overcome the differences of each individual without developing many versions of learning content [16]. For example, Intelligent Tutoring Systems (ITS) is a broad term that refers to any computer-based learning system that combines artificial intelligence components. This has received significant attention in the field of computer-based learning, enabling the design of new computer-based education to improve student motivation and performance. These examples are designed to effectively adapt to the current level of knowledge and understanding of users, and guide them towards learning objectives with relevant learning content [1]. This can also be used in learning various fields. In terms of e-learning application architecture, consider campus virtual host applications and external tools [17].

The pedagogical model applied to e-learning is supported in the following attributes: learning is a social process, learning in groups is the basis for achieving knowledge; distance is not important (space questions are obscured); teaching and learning can be separated in time and space [18]. E-learning can be an effective means of

providing post-secondary education [19]. They compete with historical inconsistencies and involve in dialectical reconfiguration of organizing procedures to accommodate e-learning [21]. Active participation in the learning process is very important for the success of e-learning and that log data can function to predict learning outcomes [21].

It is necessary to consider personality effects as a practical approach to measuring differences in learning styles. Thus, getting attention to ways to consider personality traits in designing computer-based learning systems [1].

II. METHOD

The research method used is a literature study by examining 28 journals and 8 books relating to the use of adaptive e-learning and the character of the learner personality. The results of various literature reviews will be used to identify e-learning learning models and personality traits of students using qualitative descriptive.

III. RESULT

a. *Learning and Personality*

Efforts to combine learners' cognitive styles into computer-based learning are not new. For example, Brusilovsky (2001) identifies many cognitive features that are able to encourage adaptation for individual learning, shown in Figure 1, although he does not include personality traits in adaptation.

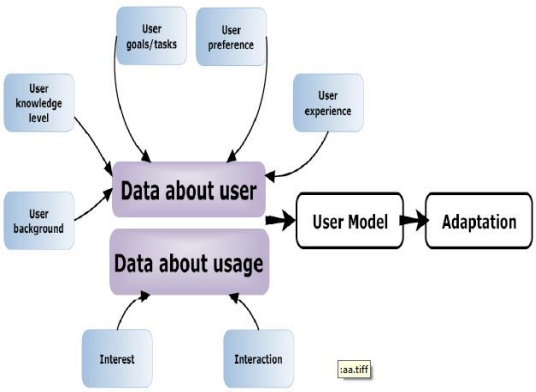

Figure 1. The user model of an adaptive e-learning system, extended from Brusilovsky (2001) [1]

Figure 1 also illustrates how these cognitive features are considered in a smart tutoring system. ELM-ART provides adaptive navigation support and dynamic content sorting that is able to match current goals for students to their previous level of knowledge. The approach based on the cognitive features described in Figure 1 shows the way forward, but how they can be fully implemented in computer-based learning is still difficult to understand. For example, current user knowledge must always be monitored to present the right level of learning content, so that many computer-based learning systems have mandatory tests at the end of each learning module. This crude approach is not practically universal and is not optimal in learning experiences (ie, paradoxical flow) [1].

A rather controversial way to overcome individual differences has been proposed by personality psychologists. A person's personality has a significant influence on how students might or do not want to be involved in their learning process, regardless of their personal interests or the stages of cognitive development [23]. This perspective seems useful given the increasingly complex e-learning system, which contains extensive content and allows various learning pathways. Understanding the concept of preferred learning styles to facilitate search and navigation is a fundamental requirement for the design of adaptive learning systems, because the system must match user learning styles and interests to maintain their attention in unsupervised learning. personality types may reflect students' preferences in digesting information and making decisions, bringing forward personality effects in computer-based learning [23]. Tuckman's scaffolding strategy is aimed at improving the quality and frequency of learner and learner-learner interactions, taking into account feedback mechanisms, motivational meetings, and personal accountability [24].

Participants showed enthusiasm and intrinsic desire to know while others seemed easily bored and not interested. Motivation for learning does not only come from external content, but also from oneself, which emphasizes the role of the intrinsic nature of the human mind. It is also true that in computer-based learning people must be motivated and valued because they invest their time and effort into becoming knowledgeable [1].

b. *3.2. Personality style and learning*

Although there is no consensus on the definition of personality, it is assumed that the term refers to dynamic mental structures and coordinated mental processes that determine emotional adjustment and individual behavior towards their environment [25]. Some general perspectives on learning behavior thus suggest many reasons for saying that personality is related to the individual learning process.

Research [26] has shown that students with certain traits appear to be intrinsically motivated, if not, still not involved. Second, research on individual differences in reasoning style shows that those who are high in the nature of achievement motivation consistently direct strong and persistent efforts to achieve tasks that demand learning. Finally, research on various types of intelligence [27] shows that students are taught in ways that are consistent with reasoning or their motivational modes may reach a higher level. This view implies that the degree of compatibility between computer-based learning and student personality seems to be an important consideration in the design of adaptive e-learning systems.

In the state of the art the Adaptive Educational Hypermedia (AEH) system and Open Learner Environments (OLE) use learning styles as the basis of understanding texts, besides quantitative studies have also been evaluated for adaptation and navigation techniques [22].

There are many models, inventories, sizes and proposed questionnaires that help determine the learning style of personality traits, such as the Big Five theory, Learning Style Inventory (LSI), and the Myers-Briggs Type Indicator (MBTI). Previous research based on the Big Five theory all shows that the core aspects of human personality tend to have a strong influence on learning behavior, specifically, motivation and reasoning processes [1]. Another well-known model of learning style related to personality traits is the Kolb Learning Style Inventory (LSI). LSI consists of two dimensions in the learning process: perception (abstract-concrete) and processing (active-reflective). The combination of these two dimensions states that learning styles can be classified into convergent learners, different learners, assimilators, and accommodators [28].

Learning style is an approach and a way to get more precise information. Unlike the case which is said [29] learning styles are the most efficient and effective habits in receiving, processing, storing and issuing something learned. So, learning styles in the context of learning, can be understood as an approach in order to streamline learning in order to achieve better learning outcomes.

Based on the development of adaptive e-learning it is possible to (1) overcome the limitations of the number of teaching hours, (2) students can learn based on an individual approach, (3) increase mastery of student understanding of a learning material, (4) so that learning objectives can be achieved as provisions which have been set. The adaptive referred to in this e-learning development research is an adaptation to the visual, audio, and kinesthetic learning styles (VAK). Teaching materials (content of material) are developed taking into account student learning styles so that the material and information delivered can be easily accepted. [30]. The ideal condition for students if they want to get satisfying learning outcomes is that students can learn with appropriate learning styles and are supported by several factors [31].

Finally, the Myers-Briggs Type Indicator (MBTI) [32] has been widely used and validated widely in the education domain. The MBTI classifies personality traits into four dichotomies: introverted feelings, sensing-intuitions, thinking, and extra-introverted perceptions. Evidence for the validity of the MBTI theory, thus, is substantial. Many MBTI-based studies of pedagogical attitudes are therefore noteworthy. Extravert tends to be active, while introverts are more reflective. Individuals who have high intuition prefer to evaluate information more intuitively, while individuals who are low in this case (ie, people who feel) use systematic information processing. Conversely, students who have high introversion have low achievement motivation, show a learning style that is not directed, and have difficulty in identifying and processing what material is important. Interestingly, the learning style theories above have many similarities to determine personality types. For example, two dimensions of LSI and MBTI Kolb are replicated quite closely: perceptions (abstract-concrete) in LSI related to MBTI feeling thinking and processing (active-reflective) correlate with the MBTI extraverted-type. In the same way, four of the five factors in the Big Five theory are equivalent to four dimensions in the MBTI, as follows: extraversion in the Big Five, sensing (openness to experience in the Big Five), thinking (agreeableness in the Big Five), and assess (correlate with seriousness in the Big Five) [1].

IV. DISCUSSION

The user interface influences the use of e-learning content efficiently because it functions as an information channel that mediates the relationship between tools and artifacts [33]. In general, our participants seem to benefit from ELM-ART in terms of correct answers and the amount of navigation. These results clearly show that adaptive e-learning systems can provide advantages compared to traditional e-learning. In utilizing adaptive e-learning products, there are a number of things that need to be prepared by the teacher, namely identifying the material, developing the contents of the material in the form of multimedia, the teacher needs to civilize online-based learning, and strive for enthusiasm in giving birth to innovation in the presentation of material based on the needs of students. [1]

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The adaptive e-learning developed has several advantages (1) the design of the instructional message is based on the results of the needs analysis, (2) the material is presented in a variety of visuals, audio, and kinesthetic, (3) which can be accessed using mobile phones, PCs, and laptops and at any time without being limited by certain space and time, (3) adaptive e-leaning facilitated learning style tests, (4) developed based on behavioristic, cognitive, and constructive learning styles so that all information and facilities can be accepted by users, (5) can be integrated into other subjects because the initial concept has been facilitated, namely learning style tests, (6) included in the category of very feasible both in terms of products and improvement of learning outcomes, and (7) has interactivity that can attract interested students [30] .

The development of adaptive e-learning at the time of implementation in order to get the results that are expected so that several indicators of evaluation (evaluation) are needed [30]. Alessi & Trollip in [30} explain some general things that must be considered when evaluating hypermedia or e-learning, namely Subject matter (scope of material), Auxiliary information (supporting information), Affective considerations. (attitude instructions), Interface (user communication with the program), navigation,

Pedagogy (learning activities), Invisible features (features that are difficult to see), and Robustness (reliability) and, Supplementary (enrichment material). The evaluation of elements of the pedagogical process (EPPs) needs to be repeated to fulfill the dimensions performed. [14]. Technology is used to apply different pedagogies, both based on prevailing psychological conceptions, new psychological explanations, and pedagogical justification [35].

Hypothetically, groups of users who have suitable learning material structures will have efficient navigation / repetition movements. Thus, self-organizing learning activities by introverted students might indicate a mismatch between their personality traits and the type of their learning system, although doing more repetition or navigation might indicate higher self-alignment, involvement, curiosity and so on, in the realm of context other learning [1].

Personality traits (at least extraversion) affect learning activities in adaptive e-learning systems. Another empirical contribution is that our participants appear to be different in responding to learning content related to learning styles that can be derived from personality traits. This might imply better learning outcomes for intuitive personalities. This pattern is equivalent to personality traits of thinking too. Participants learn better in learning procedural knowledge than participants' feelings, which have also been found in some other work, that personality values think logical processes [32]. Of course it doesn't make sense to believe that users can use different learning styles, not from the personality traits they are assessed in, in real learning situations. However, data can be taken to show that care is needed when designing e-learning systems and awareness of personality and learning content needs to be invited to evolve.

V. CONCLUSION

In utilizing the features of designing adaptive e-learning systems, we must note that using personality variables to describe different components of learning effects is not new, but few have empirically done this before with adaptive e-learning systems. Personality variables were introduced in this study, as a result, this could link a number of different user modeling factors. By modeling our users means personality traits that can be an indication of their learning styles and preferences which can be used to compile appropriate learning material. This will help to design computer-based learning activities by making explicit the personality traits of the user. The development of adaptive e-learning is developed on the basis of an increase in learning outcomes based on students' learning styles. [30]. The application of Massive Open Online Courses (MOOC) can contribute critically to adaptive initiatives being part of PLE students and professionals [36].

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