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Validity of E-Learning Module in Genetic Courses as One of The Technology Information Based Learning Innovations

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***Abstract*—Information technology is currently growing rapidly with great benefits. Learning in the classroom will be very efficient and effective when using of information technology. In the genetic course is expected to be able to implement virtual learning as an innovation course. This study aims to describe the theoretical validity (content and construction) of the genetic e-learning module that has been developed. The development of genetic e-learning module was carried out according to the R & D (Research and Development) method which limited to the potential and problem stages, gathering information, product design, and product validation. Genetic e-learning module that contains material power point slides, video link features for deepening of material, assignments, and discussion forums that were uploaded in the virtual learning system of the Universitas Negeri Surabaya. Module that have been developed was validated by 3 experts. The validation results get an average score of 3.5 (out of a maximum score of 4). Based on these scores it could be concluded that the genetic e-learning module developed was theoretically feasible in terms of content and construction to be tested on a limited basis.**

Keywords: validity, e-learning, genetic, learning innovation, technology information

I. INTRODUCTION

The new paradigm of the current learning process is no longer describes face-to-face activities in the classroom but the current learning process that has been widely accepted is the learning process that still maintains social interaction by utilizing information technology [1]. This learning is known as e-learning which has some flexibility, for example, it can be accessed anytime and anywhere [2], utilize the internet [3][4], the learning functions as optional, complementary and substitution [2], using electronic device especially computer [5]. Several studies reported that e-learning is very effective and can be improve students' problem solving skills [6], increase motivation [7], perfecting face-to-face in class, creating active student learning, and establishing communication via electronic media [8], teaching materials can also be distributed quickly and can accessed by many users [1].

E-learning can be implemented with several way, which are usually divided into two way, namely synchronous and a-synchronous. Synchronous, when educators provide material, students can directly listen, and a-synchronous, when messages from educators are recorded first before use [9] [10]. But in general e-learning has the characteristics of utilizing electronic technology services, teaching materials used are standalone, as well as learning schedules, curriculum, results of learning progress, and matters relating to education administration that can be seen at any time [11]. Well-managed e-learning can create student-centered learning where students can manage and construct their own knowledge [8], teaching materials can be widely distributed by utilizing internet services that support e-learning including email, internet relay chat (chatting), and multimedia / website services [8].

In this study, the development of e-learning module on genetic courses uploaded in the virtual learning system of Universitas Negeri Surabaya will be implemented to genetic lectures. In accordance with the stages of the Research and Development (R & D), before the genetic e-learning module is tested on students, theoretical validation must first be done by experts. The results of the experts' validation which were the theoretical validity (content and construction) of the genetic e-learning module will be presented in this article.

II. METHODS

The method used in the development of the genetic e-learning module was Research and Development (R&D) which adapted from the Research and Development model by Sugiyono [12]. The first stage was potential and problem stage. At the potential stage, the potential of genetic course was carried out to the maximum extent possible to lead students to achieve learning outcomes that have been determined and the problem stage was carried out to look for problems faced in genetic learning. The next stage was gathering information, especially reviewing the genetic semester learning plan that has been prepared previously (that has not accommodate e-learning). The result of this stage was a genetic semester learning plan that has integrated with e-learning. The product design phase was carried out by designing the module to be developed, so the results were in the form of a

storyboard and a complete genetic e-learning module. The e-learning module produced was uploaded at http://vinesa.unesa.ac.id. At this stage the instruments needed were also designed, so the results obtained were various types of research instruments including the theoretical validation instruments of the genetic e-learning module used in this study and the results were presented in this article. The next stage was product validation by 3 experts to validate the genetic e-learning module that has been developed in the previous stage. Validation was related to content and construction. Input from the validators were accommodated in the product revision process. Then the product revision will be trialed at the later stage of the R&D phase. The implementation of the product validation stage produces data in the form of theoretical validity that will be presented in this article.

Table 1 Theoretical validity of the genetic e-learning module by 3 expert validators

No.	Design	Scores			Average	Mode
		V1	V2	V3		
1.	The structure of the material is clear, the subjects and sub-subjects are clear, each having (1) an introduction, (2) an explanation and (3) the resume.	3	3	4	3.33	3
2.	Content is presented in languages that are (1) communicative, (2) complete, and (3) there are links to sites or documents to enrich the content.	3	4	4	3,67	4
3.	The variety of learning objects (text, images, audio, video, animation, simulation) selected meets the elements (1) according to the needs of the students, (2) the characters of the students, and (3) the learning achievements in the Lesson Plan of Semester.	3	4	4	3,67	4
4.	The references used (1) correspond to those used in the module, (2) are relevant to the module content, and (3) links are provided to facilitate the students.	4	4	2	3,33	4
5.	There are features in the form of (1) link terms and their meanings, (2) list of notations, and (3) list of symbols, especially if they are often mentioned in the text.	2	2	4	2,67	2
6.	Visual display (1) is clear, (2) text is easy to read, (3) charts are labeled adequate and free of visual disturbances.	4	4	4	4	4
7.	Interface behavior (1) is consistent, (2) predictable, and (3) easy to follow.	3	4	3	3,33	3
8.	Can be accessed using devices (1) a computer, (2) portable devices, and (3) mobile.	4	4	4	4	4
Average of total score					**3,5**	
Overall mode						**4**

III. RESULTS AND DISSCUSSION

The theoretical validity of the genetic e-learning module was based on the validation instrument which was adapted from the Development Research Guide Module of E-learning Unesa 2018 [13]. The results of the validation of 3 experts on the e-learning module developed were as described in Table 1. Based on Table 1 above, it can be stated that as a whole, the genetic e-learning module that was produced was theoretically valid and can be continued to the trial stage. The maximum score was obtained on aspects of (a) content, (b) variety of objects, (c) references, (d) visual display, (f) variety of devices to access. The material structure and interface behavior aspects get a validity score of 3, while the symbol and term link aspects get the lowest validity score (score 2). In the developing modules for learning activities must pay attention to the understanding of the learning module itself. There are two understanding of the module, that is the module as a learning system and the module as a learning package. The genetic e-learning module developed in this study was a module as a learning system.

Module as a learning system means that a subject or field of study is broken up into small units and then sorted up using learning analysis techniques and learning hierarchies to make it easier to learn. The order can be hierarchical or procedural or a combination of the two. The order also illustrates that complete mastery of a module is a prerequisite to learn the next module [14] [15]. In the genetic e-learning module that was developed, the order of the material was arranged in such a way that it meets the requirements as a learning system, therefore in aspects of (a) content, (b) various objects, (c) references, (d) visual appearance, (f) the variety of devices to access gets a validity score of 4. Aspects of language in writing the main module must meet the main ladder communicative and obey the rules of the language used. The communicative nature and language clarity are very important because modules are commonly studied independently by students [16]. These language rules were accommodated in the preparation of modules in this study so that the validity score of the aspects of language was also maximal.

One of the advantages of the e-learning module is its ability to accommodate various aspects of learning such as text, book content, animation, video and others [17], which may not be accommodated by conventional modules. In the genetic e-learning module that was developed, the variety of learning that presented were text, images, audio, video, animation, simulation, which according to the validators have fulfilled diversity, so it get the maximum score for the learning aspects presented in the module.

The e-learning module is a scientific work which, of course, must meet certain requirements, one of which is a reference. The development of this module used references that relatively up to date, so that the latest developments can be accommodated. Therefore the validity score obtained at the reference aspect was also maximal. In genetic study materials there were not much variety of symbols and terms presented so that the validity score obtained was low (score 2). This can be explained that the variety of terms and symbols is very dependent on the characteristics of the study

material. On study materials such as mathematics and statistics are of course full of symbols.

The visual display and variety of devices that used in e-learning module that was developed also get a maximum validity score because in looking for video links was paying attention to aspects of the contents of video material, the language used, and image quality. The visual appearance of e-learning websites can have a positive and significant influence on learning motivation [18]. While the interface behavior, consistency, predictability and easiness to followed in the genetic e-learning module that was developed get a validity score of 3.

IV. CONCLUSIONS

Based on expert validation of the genetic e-learning module, it was obtained that the module was declared theoretically valid in terms of content and construction so that the research could proceed to the testing phase.

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REFERENCES

[1] Darmayanti, T., M.Y. Setiani & B. Oetojo. 2007. *E-learning* Pada Pendidikan Jarak Jauh:Konsep Yang Mengubah Metode Pembelajaran Di Perguruan Tinggi Di Indonesia. *Jurnal Pendidikan Terbuka dan Jarak Jauh*, *Volume 8, Nomor 2, September 2007, 99-113.*

[2] Maryani, Y. 2013. Aplikasi *E-learning* Sebagai Model Pembelajaran Berbasis Teknologi Informasi di Jurusan Kesehatan Gigi Poltekkes Kemenkes Pontianak. *Vokasi Volume 9, Nomor 1, Februari 2013 hal 27 – 39 ISSN 1693 – 9085.*

[3] Kuryanti, S.J. 2016. Rancang Bangun Sistem *E-learning* Sebagai Sarana Pembelajaran. *Jurnal Khatulistiwa Informatika*, *Vol. 4, No. 1 Juni 2016.*

[4] Silahuddin. 2015. Penerapan *E-learning* dalam Inovasi Pendidikan. *Jurnal Ilmiah Circuit Vol. 1 No. 1 Juli 2015.*

[5] Mutia, I. & Leonard. 2013. Kajian Penerapan *E-learning* Dalam Proses Pembelajaran di Perguruan Tinggi. *Faktor Exacta 6(4): 278-289, 2013 ISSN: 1979-276X.*

[6] Situmorang, A.S. 2016. Model Pembelajaran *E-learning* Berbasis Web Terhadap Kemampuan Pemecahan Masalah Mahasiswa Prodi Pendidikan Matematika FKIP Universitas HKBP Nommensen T.A 2015/2016. *Jurnal Suluh Pendidikan FKIP-UHN Volume-3, Edisi-1, Maret 2016 Halaman 12-22 ISSN: 2356-2595.*

[7] Hernawati, E. & P. Aji. 2016. Perancangan dan Penerapan Konten *E-learning* melalui Learning Management System dalam Meningkatkan Motivasi Belajar: Studi Kasus pada Matakuliah Pemrograman Basis Data. *Journal of Information Systems Engineering and Business Intelligence Vol. 2, No. 1, April 2016.*

[8] Ramdani, R. & E. Murdani. 2014. *E-learning* Sebagai Media Pelengkap Pembelajaran Konvensional pada Pokok Bahasan Besaran dan Satuan. *ProsidingPertemuanIlmiah XXVIII HFI Jateng & DIY, Yogyakarta, 26 April 2014 ISSN : 0853-0823.*

[9] Tambunan, H. _____. Model Pembelajaran Berbasis *E-learning* Suatu Tawaran Pembelajaran Masa Kini dan Masa Yang Akan Datang. Fakultas Teknik Universitas Negeri Medan.

[10] Kusumana, A. 2011. *E-learning* Dalam Pembelajaran. *Lentera Pendidikan, Vol. 14 No. 1 Juni 2011: 35-51.*

[11] Wardani, D.N., A.J.E. Toenlioe & A. Wedi. 2018. Daya Tarik Pembelajaran di Era 21 Dengan Blended Learning. *JKTP Volume 1, Nomor 1, April 2018, e - iSSN: 2615-8787.*

[12] Sugiyono. 2014. *Metode Penelitian Pendidikan Pendekatan Kuantitatif, kualitatif, dan R&D*. Alfabeta. Bandung.

[13] Tim E-learning Unesa. 2018. *Panduan Penelitian Pengembangan Modul Kuliah Daring (E-learning) Unesa 2018*. Lembaga Penelitian dan Pengabdian kepada Masyarakat, Universitas Negeri Surabaya. Surabaya.

[14] Russell, James D. 1974. Modular instruction: a guide to the design, selection, utilization and evaluation of modular materials. Minneapolis: Burgess Publ.Co.

[15] Gafur A. 1986. Disain Instruksional: Langkah sistematis pengembangan pengajaran. Sala: Tiga Serangkai.

[16] Susilo, A., Siswandari & Bandi. 2016. Pengembangan Modul Berbasis Pembelajaran Saintifik untuk Peningkatan Kemempuan Mencipta Siswa dalam Proses Pembelajaran Akutansi Siswa Kelas XII SMAN I Slogohimo 2014. *Jurnal Pendidikan Ilmu Sosial*, 26(1): 1412-3835.

[17] Pramono, M., Yustanti, W., Sukarmin, Sumarno, A., Nudin, S. R., Wibawa, S.C., Maureen, I.Y., Bisma, R. 2015. *Pengembangan e-Materi Virtual Learning*. Unipress Unesa University. Surabaya.

[18] Hamzah, A.A., A. Syarief & I.S. Mustikadara. 2012. Pengaruh Tampilan Visual Terhadap Motivasi Belajar Berdasarkan Kategori Website E-learning. *Seminar Nasional Aplikasi Teknologi Informasi 2012 (SNATI 2012).* Yogyakarta 15-16 Juni 2012.