Temukan pesan, dokumen, foto, atau orang

Awal

Tulis

Email Masuk
Belum Dibaca
Berbintang
Draft 25
Terkirim
Arsip
Spam
Sampah
Lebih sedikit

Tampilan Sembunyikan
Foto
Dokumen
Langganan

Folder Tampilkan

← Kembali | Arsipkan | Pindahkan | Hapus

Kepada:
haviz80@yahoo.co.id

Dr. M. Haviz:

We have reached a decision regarding your submission to Transylvanian Review, "Designing and Developing the Integrated Learning Model on Embryology.

Our decision is to:

Revisions Required 2016-05-28

COMMENTS (Step 1=Huge revisions): Please correct your paper carefully and send it within 3 days.

1- Article type?
2- Corresponding Author: Author name, Affiliation and Email ID.
3- Include an abstract with 250 words.
4- Abstract should be include Aim (Background), Materials and methods, Results, Conclusion
5- References in Introduction section should be as Author name and year such as Wysenbeek et al. (2011). Also update this section (Introduction) with new references (2014, 2015).
6- Characterize Aim of study in end of introduction section.
7- Explain Materials and methods more with references.
8- Paper should be as Introduction, Materials and methods, Result, Discussion, Conclusion.
9- Explain discussion section more.
10- Send your paper as word format NOT pdf.
11- Characterize comments with red color.

Best regards
Editor in chief

Transylvanian Review
transylvanianreview@gmail.com
+ Tambah ke kontak

Transylvanian Review

M. Haviz

Subject: Acceptance Letter for Article No. **TR-2016-04-0528**

Thank you for your cooperation in performing all the changes requested by the reviewers. At the same time, we gladly inform you that your paper entitled: **Designing and Developing the Integrated Learning Model on Embryology**, with the registration number TR-2016-SI-04-0528, for which you are the correspondence author, was accepted for publication in Transylvanian Review with IF 0.012.

Author's Name: M. Haviz

As a result, your article/paper will be published in the following issues of the journal, according to the publishing priorities.

Transylvanian Review journal is Abstracted/Indexed in Thomson Reuters, Social Sciences Citation Index, Arts & Humanities Citation Index, SCOPUS, EBSCO, etc.

Looking forward to a good collaboration,

Sincerely yours,

Editor in chief

Vasili Salejan

.....,

Transylvanian Review

Temukan pesan, dokumen, foto, atau orang

Awal

Tulis

Email Masuk
Belum Dibaca
Berbintang
Draft 25
Terkirim
Arsip
Spam
Sampah
Lebih sedikit

Tampilan Sembunyikan
Foto
Dokumen
Langganan

Folder Tampilkan

← Kembali | Arsipkan | Pindahkan | Hapus

Read Proof of your Article TR-2016-04-0528

Yahoo/ Email M...

transylvanian revie
Kepada:
haviz80@yahoo.co.i

Rab, 24 Agu 2016 jam 03.07

Dear Author

Your article '**"Designing and Developing the Integrated Learning Model on Embryology"**' is almost ready for publication at Journal ofTransylvanian Review. But before publication your final check will be highly appreciated. For this reason, the galley proof of your accepted article was uploaded to your author homepage.

Please, download the proof and check/read it carefully for any mistake or typographical error(s); then submit your corrections (if exist) latest with the following 72 hours.

Please note that if you not respond to this message or do not submit any possible correction within the deadline we will reserve your article for online publication as its is. Please also consider that no changes can be made in your article after this step.

Kind Regards
Editor in Chief

Transylvanian Review
transylvanianreview@gmail.com
+ Tambah ke kontak

Temukan pesan, dokumen, foto, atau orang

Awal

Tulis

Email Masuk
Belum Dibaca
Berbintang
Draft 25
Terkirim
Arsip
Spam
Sampah
Lebih sedikit

Tampilan Sembunyikan
Foto
Dokumen
Langganan

Folder Tampilkan

← Kembali | Arsipkan | Pindahkan | Hapus

Your Article is Published TR-2016-04-0528

Yahoo/ Email M...

transylvanian review
Kepada:
haviz80@yahoo.co.id

Kam, 25 Agu 2016 jam 04.17

Dear Author
Please find attach your published article file.

Kind Regards
TR Team

TR.07-0528.... .pdf
513.7kB

Balas, Balas ke Semua atau Teruskan

Transylvanian Review
transylvanianreview@gmail.com
+ Tambah ke kontak

TRANSYLVANIAN REVIEW

SPECIAL ISSUE

VOL XXIV, NO. 7, SPECIAL ISSUE, 2016

Transylvanian Review
Centrul de Studii Transilvane| str. Mihail Kogalniceanu nr. 12-14, et.5, Cluj-Napoca
Email: transylvanianreview@gmail.com / WebSite: http://www.centruldestudiitransilvane.ro/

Transylvanian Review

KEYWORDS

Asbestosis Atypical Baba Bulleh Shah, Extremism, Khawja Ghulam Fareed, Mysticism, Pakistan, Terrorism Fibrous pseudotumor Green Revolution Inductive Decision Tree Kawasaki disease Pakistan Tennis elbow brake shoe manufacturing coffee shop commitment coronary artery lesion customer relationship gamma globulin, high efficiency eco-agriculture loyalty modern agriculture occupational health service quality trust

Journal Contact

Principal Contact

Dr. Vasile Salijan
Email: transylvanianreview@gmail.com

Support Contact

Dr. Virgil Leun
Email: transylvanianreviewjournals@gmail.com

ISSN: 1221-1249

Transylvanian Review

KEYWORDS

Asbestosis Atypical Baba Bulleh Shah, Extremism, Khawja Ghulam Fareed, Mysticism, Pakistan, Terrorism Fibrous pseudotumor Green Revolution Inductive Decision Tree Kawasaki disease Pakistan Tennis elbow brake shoe manufacturing coffee shop commitment coronary artery lesion customer relationship gamma globulin, high efficiency eco-agriculture loyalty, modern agriculture occupational health service quality trust

CURRENT ISSUE

ATOM 1.0
RSS 2.0
RSS 1.0

2016: Vol XXIV, No. 07

Open Access Subscription Access

Table of Contents

Articles

IMPORTANT (SUBMIT YOUR PAPER)

To submit a manuscript, read here carefully. In case you do not like to use the online submission system; which allows you to track the progress and the status of your paper online, you can send your paper directly by email using:

transylvanianreview@gmail.com

Omeje J. C, Kuchi M. A, Adikwu V. O, Chinweuba N. H

Municipal Solid Waste Characterization in Nsukka Urban in South East Nigeria PDF
Ugwuishiwu B. O, Nwodo J. C, Echiegu E. A.

Mobile Devices and Listening Skill among Adolescents in the Tertiary Institution PDF
Obikwelu C. L., Ngwoke D. U., Oyeoku E. K.

Molecular Mass Homology between Proteins in Different Jellyfish Crude Venoms: A Systematic Review PDF
Nabipour I, Mohebbi G. H, Vatanpour H, Vazirizadeh A, Ostovar A, Ebrahim Najafabadi K

Designing and Developing the Integrated Learning Model on Embryology PDF
Haviz M

Development of an Efficient Tissue Culture Protocol from Different Explants of Spilanthes Acmella M. PDF
Abyari M, Nasr N, Siavoshi M

Water Resources in China under Global Climate Change: Sustainable Management and Challenges PDF
Xiuqin Z, Feng W, Yahua W, Liyan Y, Xingmin M, Hongbo S

ISSN: 1221-1249

Designing and Developing the Integrated Learning Model on Embryology

*Haviz M.

*Department of Biology Education, State Institute of Islamic Studies (IAIN) Batusangkar, West Sumatera Indonesia.

Abstract

The aim of this research was to design and develop of integrated learning model (ILM) on embryology. There are the complex problems found on embryology learning, such as the use method of teaching is not equal with learning material, low mastery of learning, and learning of material of embriology are theory, concept, and process. The complex problems also show that students have different academic ability. These complex problems is need for a research approach in educational practice on Embryology learning. Method is an educational design research with phase: preliminary research, prototyping phase, and assessment phase. The implementation of the model use the participants are students, practitioners and experts. The instruments used were validation and observation sheets. Means and standard deviation are calculated for finding the level of validity and observation on learning process. The result of this researsch shown that the relevancy and internal consistency of ILM on embryology learning based on characteristic, validity and observation on learning process. The result also shown that the product can be reflected in several aspects; design, model construction, learning approach, skills and learning method, and the relevance of integrated learning as an adaptive instructional system with development in higher education. ILM on Embryology learning has limitations in some sections. For the improvement, it is necessary to pay attention on deficiencies that become a factor of limitations on ILM. In conclusion, the relevancy and internal consistency of ILM on embryology learning based on characteristic, validity and observation on learning process.

Keywords: Design, develop, validity, integrated learning model (ILM), embryology learning.

*Corresponding Author: Corresponding Author: Department of Biology Education, State Institute of Islamic Studies (IAIN) Batusangkar, West Sumatera Indonesia. Jalan Sudirman No. 137 Kuburajo Lima Kaum Batusangkar, West Sumatra Indonesia, 27213. Email:haviz80@yahoo.co.id

Introduction

Developing of learning theory that use on learning practice. Because there are paradigms revisited has investigation into a model to integrate objectivism and constructivism in instructional design (Elander and Cronje, 2016). Change in higher education can be conduct with integrated learning to development of sustainable assessment skills, elements of sustainable assessment and instructional methods for guiding students in the development of sustainable assessment skills (Fastré *et al.,* 2013), and a work integrated learning partnership model for higher education graduates to gain employment (Govender and Taylor, 2015). Change in higher education also can be conduct by improving course evaluations to improve instruction and complex learning (Frick *et al.,* 2010).

The improvement of higher education quality is one of important issues in low or middle income country. The higher education institutions are large, complex, adaptive social systems like all other human organizations, likely curriculum design/alignment, student employability, widening participation, quality of learning and teaching, quality of research, accreditation, integration of knowledge capital and cross-curricular initiatives and higher education governance and management and others (Sarker *et al.,* 2010). In low incomes country, there are five dimensions of quality that recurring themes of debate on quality effectiveness, efficiency, equality, relevance and sustainability. These five dimensions can serve as a basis for analysing the quality of educational innovations aimed any aspect of the education system, e.g. policy changes, national administration, local administration, classroom interventions (Barrett *et al.,* 2006).

There are a number of drivers of change in higher education today, including technology, globalization, changing demographics, economy, changing employer needs, increased demand for accountability, changing student expectations (Casares *et al.,* 2011). The ways of improving the quality of education is to improve learning. First, ILM proveing the quality of education need to be firmly focused on improving and oopportunityies to learn how to address learner diversity and adequate behaviour (Barrett *et al.,* 2008). Second way is improving students learning by supporting quality teaching (Hightower *et al.,* 2011). Third, education can be improved by assessment, innovation, and evaluation (Henry *et al.,* 2006).

The effective of planning on teaching and learning can be approve by a systematic design of a learning. The study about systematic design of a learning can be address to to examine the effectiveness of systematically designed subject matter instruction in stimulating the development of domain-specific and domain-general CT skills, and to investigate the relationship between the two (Tiruneh *et al.,* 2016). This study also show that a learning environment, in the context of a freshman physics course, was designed according to the First Principles of Instruction model. Developing educational materials also show that is an important factor on the planning on teaching and learning such as developing educational materials about risks on social network sites (Vanderhoven *et al.,* 2016).

Design of information communication and technologies (ICT) is a factor on the planning on teaching and learning such as intrinsic integration of domain-specific learning in game mechanics and game world (Ke, 2016); analysed 106 effective, ineffective and extraordinary instructional design and multimedia production (MP) activities (Sugar and Luterbach, 2016) and other maximizing research and development resources: identifying and testing load-bearing conditions for educational technology innovations (Iriti *et al.,* 2016).

The planning on teaching and learning is a fundamental aspect of the role of educators. The activities involved are not carried out in a vacuum, but rather in accordance with the nature of the institution. The educators are must reasonably be expected to have an understanding of the culture of the institution are the mission and vision of the organization, the aspirations, the ethos and values (Stefani, 2008). The higher education is required to apply the specific learning in accordance with the characteristic of the outcomes. The changes in learning systems require the educators to revise instructional design, that is called adaptive instructional system (Park and Lee, 2002), that will be a reference for educators to make intervention necessary for individual learners and can increase their knowledge and skills. The adaptive instructional system can be designed and revised with modern and integrative instruction (Agostinho *et al.,* 2003; Herrington and Oliver, 2000).

The modern instructional is a systematic process of building the instructional system that is effective and efficient (Suparman, 2012) and integrative instruction is one form of learning and part of the modern instructional (Drake and Burns, 2004). Then, there are some articles that related this study. There are the articles studied about model design (Richey *et al.,* 2002), the use of the concept, theory and the evaluation of model (Yanchar *et al.,* 2010; Williams *et al.,* 2011; Jonassen, 2006; Reigeluth and An, 2006), the integration of methods (Sadik, 2008; Erdogan, 2011; Dummer *et al.,* 2010; Cronje, 2006), and the adaptive instructional system (Park and Lee, 2002).

At preliminary, the complex problems found on embryology learning in our institution, such as the using method of teaching is not equal with learning material, low mastery of learning, and embryology course is the main and prerequisite subject at Department of Biology Education, State Institute of Islamic Studies (IAIN) Batusangkar, West Sumatera Indonesia. The complex problems also show that students have different academic ability. Based on preliminary results show that GPA's students can divide into five grades, namely grade 1 is very

good or '3.51 – 4.00' (χ = 23.37 %), grade 2 is good or '3.01 – 3.51' (χ = 43.5 %), grade 3 is good enough or '2,76 – 3,00' (χ = 17.22 %), grade 4 is less good or '2.51 – 2,75' (4.75 %) and grade 5 is not good < '2,50' (χ = 7.27 %). Based on the value of animals structure course showed that student also have different academic ability. The score of students are grade 1 is very good or 'A' or '80 – 100' (χ = 19.13 %), grade 2 is good or 'B' or '65 – 79' (χ = 78.87 %), grade 3 is good enough or 'C' or '55 – 64' (χ = 57.14 %), grade 3 is less good or 'D' or '45 – 54' (χ = 8.76 %), and grade 5 is not good or < '45' (χ = 2.08 %). The complex problems also show that students coming from different types of schools. This data can divide in to five categories, namely the type 1 is natural science of senior high school (χ = 58.1 %), type 2 is social science of senior high school (χ = 4.84%), type 3 is natural science of Islamic high school (χ = 31.20 %), type 4 social science of Islamic high school (χ = 3.90 %) and type 5 vocational high school (χ = 1.92%). The The complex problems also show that the learning of material of embriology are theory, concept, and process. The result of analysis on embriology contents was given in the following explanation.

At spermatogenesis, sperm maturation process occurs in the epididymis (Visconti *et al.,* 1995), that its very typical cell, the core is packed so densely with acrosome found in the apical region near the nucleus and mitochondria are arranged in a spiral shape around the base of the flagellum (Garner and Hafez, 2000). There is a change in the topography of the spermatid cells consists of four phases, Golgi complex, cap, acrosome and maturation (Jhonson and Everitt, 1995). Spermatozoa maturation process is also accompanied by the series of changes in the composition, for example, changes in the number and presence of particular proteins in the membrane of the sperm head. This process is call polarization protein that it needed in changes in morphology and function of spermatozoa (Hunnicut *et al.,* 1997). In this process, the protein is segregated from the anterior head domain or posterior head domain and found when spermatozoa momentarily left testes. Furthermore, the result of content analysis on fact was done in the following section. The results research showed that the membrane before it mixes with ejaculated, the spermatozoa still have an important component when in the caudal epididymis. The results of the study show the structure of the sperm membrane (Kohane *et al.,* 1987) is covered by proteins, carbohydrates, lipids and other materials, that it's release from the surface of the sperm membrane is an important part of capacitation (Visconti *et al.,* 1995).

The epithelial cells actively secrete fluid needed spermatozoa while in the epididymis (Setchell *et al.,* 1994) as changes in sperm surface associated with epididymis transit (Hammerstedt and Parks, 1987) and preventing the acrosome reaction early in the epididymis and shortly after ejaculation (Hunter *et al.,* 1978). The others show that the material facts produced in the tubules; it will undergo a series of maturation process in the epididymis (Bredford, 1975). Mass, there is interaction between spermatozoa and it to the epithelial cells of the epididymis (Hammerstedt and Parks, 1987). At maturation, sperm acquire the ability to move, and the ability to fertilize from epididymis protein is sperm-egg binding proteins (Yanagimachi, 1994) and proteins that play a role in the agglutination between spermatozoa (Dacheux *et al.,* 1983). Agglutination effect decreased in the caudal epididymis before sperm are ejaculated (Dacheux and Dacheux, 1988). This is presumably due to the presence of other protein components that act as anti-agglutinin (Harayama *et al.,* 1994).

These complex problems is need for a research approach in educational practice on Embryology learning. The research approach is educational design research. Educational design research is perceived as the systematic study of designing, developing and evaluating educational interventions, such as programs, teaching-learning strategies and materials, products and systems – as solutions to such problems, which also aims at advancing our knowledge about the characteristics of these interventions and the processes to design and develop them (Plomp, 2010).

There are several studies about design and development integrated learning model are an integrated model for developing sustainable assessment skills (Fastre *et al.,* 2013); an integrated conceptual model with applications for course design and instruction (Majeski *et al.,* 2016); the design and development of the dragoon intelligent tutoring system for model construction (Wetzel *et al.,* 2016); a pluriliteracies approach to content and language integrated learning – mapping learner progressions in knowledge construction and meaning-making (Meyer *et al.,* 2015); a work integrated learning partnership model for higher education graduates to gain employment (Govender and Taylor, 2015); content-based instruction and content and language integrated learning (Cenoz, 2015); integrating critical thinking, contemplative inquiry, and the curriculum of modern life (Lewittes, 2015).

Design and develop an ILM on Embryology is need some related literature. There are some relevant theories found in this study, namely models of teaching (Joyce *et al.,* 1992), educational design research (Plomp, 2010) or developmental research (Richey *et al.,* 2002), adaptive instructional system (Park and Lee, 2002), integrative instruction (Drake and Burns, 2004), thinking map (Hyerle and Alper, 2011), cooperative learning (Slavin, 2005), and embryology (Dudek, 2011). Based on these explanations, designing the conceptual framework and the integrated instructional conceptual model were conducted. The conceptual are procedure of design and develop it is use educational design research (Plomp, 2010). The prototype of ILM should meet five components; syntax, principle reaction, social systems, support systems, and the instructional and nurturing effects. Syntax consists of

goals and motivation, information, organization, facilitation, evaluation and appreciation. The social systems are facilitator, collaborative reflector, constructors, mutual help and responsibility. The support systems are lecturers and students' guidelines, observing the implementation of the model, observing the students' skills, students' responses and achievement test. The instructional and nurturing effects are mastery of concepts (*know*), skills (*do*) and attitudes, values, and actions (*be*). The characteristic of models is meet the component of integrative instruction, thinking map, cooperative learning adaptive instructional system.

Design and develop of model is based on the relevancy and internal consistency that it characteristic, validity and observation on learning process. The aim of this research was to design and develop of ILM on embryology learning.

Materials and Methods

Research Design

This is an educational design research with phase: preliminary research, prototyping phase, and assessment phase (Plomp, 2010).

Research Questions

The research question is "what is the relevancy and internal consistency of ILM on embryology learning?"

Research Procedure

The activity of preliminary research are needs and context analysis, review of literature and development of a conceptual or theoretical framework for the study. Then, the prototype is design with charateristic meet five components; syntax, principle reaction, social systems, support systems, and the instructional and nurturing effects (Joyce *et al.,* 1992). Syntax consists of goals and motivation, information, organization, facilitation, evaluation and appreciation (Slavin, 2005). The social systems are facilitator, collaborative reflector, constructors, mutual help and responsibility. The support systems are lecturers and students' guidelines, observing the implementation of the model, observing the students' skills, students' responses and achievement test. The instructional and nurturing effects are mastery of concepts (*know*), skills (*do*) and attitudes, values, and actions (*be*) (Drake and Burn, 2004). The characteristic of models is meet the component of integrative instruction (Drake and Burn, 2004), thinking map (Hyerle and Alper, 2011), cooperative learning (Slavin, 2005) and adaptive instructional system (Park and Lee, 2002). The quality of prototype is determine by methods of formative evaluation with experts and practitioners review (Tessmer, 1993). Revision of prototype is conduct after formative evaluation. The result should demonstrate the valid and usable prototype. If not so, the prototype should be revised and formative evaluation is re-done.

Research Participants, Instruments, and Technique of Data Analysis

The prototypes can be just paper-based for which the formative evaluation takes place via expert judgments (3 experts of instructional technology education, embryology and language, and 3 practitioners of embryology education). Observation on learning process is conduct with 128 students. This study use validation sheet (score of validity = 82.50 and score of reliability = 76.69 in α Cronbach) and observation sheet (score of validity = 84.38 and score of reliability = 76.13 in α Cronbach). Score of expert judgments and observation on learning process is calculate with descriptive statistics (*mean and standard deviation*) (Miles *et al.,* 2009).

Results

The result of relevancy and internal consistency of ILM on embryology learning based on characteristic, validity and observation on learning process. The result characteristics prototype of ILM on Embryology has been designed with five components; rationality, supporting theory, characteristics, implementation guidelines and devices of ILM. The rationally part explained the importance of ILM on Embryology. The supporting theory consists of the theories used on ILM. The characteristic part includes the syntax, principles of reaction, social systems, supported systems, instructional and nurturing effects (Joyce *et al.,* 1992). The development stage consists of preliminary research, prototyping phase and assessment phase (Plomp, 2010). The integrated approach consists of interdisciplinary approach, thinking maps and problem solving (Drake and Burns, 2004). The cooperative learning consists of learning, skills, recitation, discussion, question and answer, and presentation phases (Slavin, 2005). And the last, the prototype also consists of the Embryology learning materials (Dudek, 2011). The result of validity is shown on Table 1, 2 and 3. The prototype was revised based on the comments and suggestions from the experts, practitioners and students. Then, other characteristics such as the learning materials, thinking map, and integrated evaluation technique were added to the prototype. Some of the comments and suggestions can be seen in the following; "At the supporting theory, 1) please add explanation about the correlation of learning theory and model theory, 2) use the researcher own instructional materials to make it clearer and can be understood easily, and 3) re-design the prototype with colorful pictures and lay-out. Clarify the relationship between syntax and the students' needs. Specify the connection between the components and use the good language. Meanwhile, the supporting systems, the instructional and nurturing effects, learning approach, and

the models implementation are good already. Next suggestions are it is better to use a more comprehensive evaluation system to evaluate the students' mastery. Please revise the format of lecturer guideline. Re-design a more simples and interesting prototype. Add time allocation for group discussion or the 20th step of learning.

Table 1: the validity score of characteristics ILM on embryology learning.

No	Aspect of assessment	Result test validity (n experts = 3)		
		X	*St.Dev.*	Category
1	supporting theory	3.25	0.35	highly valid
2	syntax	3.44	0.09	highly valid
3	system social	3.5	0.71	highly valid
4	principle reaction	3.25	0.35	highly valid
5	supporting system	3.25	0.35	highly valid
6	instructional and nurturing effect	3.20	0.00	valid
7	approach	3.38	0.35	highly valid
8	implementation of the learning model	3.20	0.00	valid
	average	3.31	0.275	highly valid

Note: $\chi > 3.20$ is highly valid; $2.40 < \chi \leq 3.20$ is valid; $1.60 < \chi \leq 2.40$ is valid; $0.80 < \chi \leq 1.60$ is valid; $\chi \leq 0.80$ is invalid.

Table 2: the validity score of lecture guidelines ILM on embryology learning.

No	Aspect of assessment	Result test validity (n experts = 3)			Result test validity (n practitioners = 3)		
		X	*St.Dev.*	Category	X	*St.Dev.*	Category
1	Guidelines	3.50	0.71	highly valid	3.33	0.58	highly valid
2	syntax	3.00	0.00	valid	3.50	0.00	highly valid
3	social system	3.50	0.71	highly valid	3.33	0.58	highly valid
4	principle reaction	3.50	0.71	highly valid	3.00	0.00	valid
5	aim	3.13	0.18	valid	3.33	0.29	highly valid
6	content	3.50	0.71	highly valid	3.33	0.58	highly valid
7	language	3.25	0.35	highly valid	3.33	0.58	highly valid
8	physical form	3.00	0.00	valid	3.33	0.58	highly valid
9	benefit	3.00	0.00	valid	3.00	0.00	valid
	average	3.26	0.374	very valid	3.28	0.35	highly valid

Note: χ = means, *St. Dev.*= Standard Deviation. $\chi > 3.20$ is highly valid; $2.40 < \chi \leq 3.20$ is valid; $1.60 < \chi \leq 2.40$ is valid; $0.80 < \chi \leq 1.60$ is valid; $\chi \leq 0.80$ is invalid.

Table 3: the validity score of student guidelines ILM on embryology learning.

No	Aspect of assessment	Result test validity (n experts = 3)			Result test validity (n students = 128)		
		X	*St.Dev.*	Category	X	*St.Dev.*	Category
1	guidelines	3.00	0.00	valid	3.40	0.54	highly valid
2	syntax	3.50	0.71	highly valid	3.22	0.44	highly valid
3	system social	3.50	0.71	highly valid	3.09	0.50	valid
4	principle reaction	3.00	0.00	valid	3.29	0.00	highly valid
5	aim	3.25	0.35	highly valid	3.40	0.21	highly valid
6	content	3.00	0.00	valid	2.77	0.64	valid
7	language	3.17	0.24	valid	3.30	0.59	highly valid
8	physical form	3.50	0.71	highly valid	2.94	0.68	valid
9	benefit	3.00	0.00	valid	3.55	0.50	highly valid

	average	3.21	0.302	highly valid	3.21	0.46	highly valid

Note: χ = means, *St. Dev.*= Standard Deviation. $\chi > 3.20$ is highly valid; $2.40 < \chi \leq 3.20$ is valid; $1.60 < \chi \leq 2.40$ is valid; $0.80 < \chi \leq 1.60$ is valid; $\chi \leq 0.80$ is invalid.

Table 4: result of learning process observation ILM on embryology learning.

	Aspect	χ	*St. Dev.*	Category
Syntax	phase 1 introduce the objectives and motivations	3.06	0.35	practical or good
	phase 2 delivering learning	3.36	0.20	highly practical or very good
	phase 3 organize	3.17	0.18	practical or good
	phase 4 guiding	3.2	0.08	practical or good
	phase 5 evaluation	3.33	0.06	highly practical or very good
	phase 6 appreciation	3.31	0.09	highly practical or very good
	average	3.24	0.16	practical or good
Social system	Facilitator	3.19	0.27	practical or good
	Reflector	3.00	0.18	practical or good
	Collaborator	3.13	0.00	practical or good
	Constructor	3.06	0.27	practical or good
	helping each other	3.00	0.18	practical or good
	Responsibility	3.19	0.09	practical or good
	average	3.09	0.16	practical or good
Principle reaction	facilitating the learning process	3.17	0.18	practical or good
	Reconstructing information	3.20	0.08	practical or good
	providing guidance	3.33	0.06	highly practical or very good
	giving appreciation/reward	3.31	0.09	practical or good
	average	3.24	0.16	practical or good

Note: n observer = 3, χ = means, *St. Dev.*= Standard Deviation. $\chi > 3.20$ is highly practical/ very good; $2.40 < \chi \leq 3.20$ is practical/good; $1.60 < \chi \leq 2.40$ is enough practical/ enough good; $0.80 < \chi \leq 1.60$ is less practical / less good; $\chi \leq 0.80$ is not practical / not good.

The result of observation on learning process is describe on several meeting and it observed and noted by three observers. The result of observation at meeting 1, the students did not understand the steps of learning well. Many students were very enthusiastic in studying. Learning time management was poor, especially for step 1 and 2 that causes the next learning cannot run well. Consequently, the students' achievement is not satisfied, and the instructional model needs to be adopted by the students. The result of observation at meeting 2, the students were ready to study because they have understood the learning steps. The students did interesting discussion. Time allocated for step 3 (reading the learning materials) were quite longer, because of students' difference ability in understanding the lesson. Another observation showed that some students did works out of the learning materials. Then, some revisions were done, such as adding the time allocation for experts' discussion; revising the learning steps by combining step 14 and 15; and revising the format of assessment.

However, another problem occurred, the group discussion members were not completed so several learning groups were combined into one.

The implementation of the ILM at meeting 4 revealed a fact that the members of group 2, 4, and 5 are not completed. Consequently, there was no expert team in those groups. The solution was to combine the 3 group members to become one group. The observations on meeting 6, the lecturer explained the materials much longer, the students remained enthusiastic about performing the steps of learning, and students have integrative ability.

The observation on meeting 7, the students got a little bored in running the learning process, but still enthusiastic in learning. Then, the students' achievements were better than the previous steps, and many students already had integrative ability. The observations on meeting 8, the students already got more comprehensive experience, many students had integrative ability. However, they started undisciplined in running the learning process because of boredom. The observations on meeting 9, the students were back to enthusiastically feeling in learning and many students had integrative ability. The observation on meeting 10, the students got difficulty in understanding the learning materials, because at this step, high level of understanding was required. But, in fact, the students already mastered the high level of integrative ability.

Discussion

Design and develop of ILM on embryology based on the good theories. As it is written previously, the related theories are used in this research. The theories are the construction of models (Joyce *et al.,* 1992), educational design research (Plomp, 2010), developmental research (Richey *et al.,* 2002), adaptive instructional system (Park and Lee, 2002), integrative instruction (Drake and Burns, 2004), thinking map (Hyerle and Alper, 2011), cooperative learning (Slavin, 2005), embryology (Dudek, 2011). The result of this study also demonstrated that the ILM on embryology was designed through a good process of product development that will be used in learning process.

This result showed that the product has met the fundamental aspects of the study. It is the logical consistency and the conformity between the expectation and reality (Nieveen, 2010). This product has also met another qualification that was designed through identification process (Richey *et al.,* 2002). The product was designed through cyclical process in the activities of design, assessment, and revision. The formative evaluation (Tessmer, 1993) was done at once and reflected in systematic documentation (Plomp, 2010).

The result of this study showed that the learning process which includes syntax, social system and reaction principles performed well. The integrated learning process has the proper syntax to use in the learning process. These results also demonstrated the fulfilment of the indicators of learning models quality that has written in the research method. For example, the components of the models should be implemented by lecturers and students based on their roles in the learning process. The lecturer acts as a facilitator and the students are the main learners. Both have moderate activity based on the concept of integrative learning (Drake and Burns, 2004).

The result of this study can reflected in some aspects namely design, model construction, learning approach, skills and learning method, and the correlation of the development of ILM as adaptive instruction system and the development of higher education. The first reflection is design. This research has four stages of development, they are preliminary, prototyping and assessment phase.

This procedure was chosen because it is easy to do and can accommodate all needs in development. At preliminary phase, the analysis toward students' characteristics and instructional have done well. Based on the theory of educational design research (Plomp, 2010), the phase is called need analysis and context of the problem. Then, in-depth analysis was done about the review of related literature. The review of related literature was done to support the development of the model. For example, at the prototype stage, the design was continued by doing formative evaluation and some revision. At the preparation, the prototype has designed. At the assessment stage, practicality and effectiveness test were done. Both are part of formative evaluation (Tessmer, 1993). Finally, the results are documented systematically which followed by some reflection.

The second reflection is the model construction. The components of this model were reconstructed from the models of teaching (Joyce *et al.,* 1992). This theory explains that learning model is built by five components, namely syntax, reaction principles, social systems, proponent system and the instructional and adherent effects. This result also showed that the construction of the product is well done.

The third reflection is learning approach. This study used the theory of integrative approach (Drake and Burns, 2004). An important aspect of this theory is drawn from interdisciplinary, thinking map and problem solving. This study has met some characteristics and principles of interdisciplinary integrative, such as the central organization, the concept of knowledge, the role of disciplines, the role of lecturers, basic implementation, the level of integrative, assessment, know/do/be, planning the learning process, the nature of the approach and assessment. This study emphasizes the skills of cooperative (Slavin, 2005) and the concept of embryology (Dudek, 2011). This research has also released a product consists of thinking map and problem solving on embryology. It was used to meet the needs of learning materials on embryology which is based on facts, concepts, principles and theories.

The fourth reflection is the skills and learning methods. This study used cooperative learning which consists of skills, methods of recitation, discussion, question and answer and presentation and Jigsaw learning phase II (Slavin, 2005). The use of cooperative syntax in learning process also a part of integrated learning (Drake and Burns, 2004). The aim of the use of cooperative learning syntax is meeting the needs of students' characteristics. The diversity of students' academic achievement can be handled by using this. In addition, the use of cooperative learning syntax can help the students mastering the materials about embryology, and understanding the cooperative skill.

The fifth reflection is the relevancy of ILM as an adaptive instructional system with development of higher education. The result of this study is relevant with the adaptive instructional system theory. These findings have reconstructed the main components of learning embryology, such as instructional goals, depth of curriculum content, and delivery systems. They are adopted by using specific instructional procedures and strategies for specific student characteristics, to adapt instruction on a micro-level by diagnosing the student's specific learning needs during instruction and providing instructional prescriptions for the needs, new pedagogical approaches such as metacognitive strategies, collaborative learning, constructivist learning, and motivational competence; and three stages input, transactions and output (Park and Lee, 2002). This research related to

design and development of the curriculum in higher education. It designed to accommodate aspects of accountability and related education in the future and focus on creating an effective learning (Drake and Burns, 2004).

ILM on Embryology learning has limitations in some sections. For the improvement, it is necessary to pay attention on deficiencies that become a factor of limitations on ILM. The first limitation is that the study has tested the practicality and effectiveness simultaneously. This treatment could decrease the quality of the product, which is not resistant for revision. Based on evaluation theory, the implementation of the model by using this test evaluation was categorized as a small group evaluation (Tessmer, 1993). The weakness of this evaluation technique is to have a mid-level revision, so that the resulting products have little or no resistances to the revision. Based on evaluation theory, the type of product evaluation is categories that resistant to revision at field testing or micro evaluation. The large scale of field tests must be conducted by observing the level of user acceptance, implementation and acceptance of the other institution.

Thus, the relevant explanation is considered the resistant to revision as well as the limitations of this model of developmental research. A second limitation of this study is related to the aspects, actions and invisible values. Because it was not done by using a particular observation sheet. It requires additional observations inside and outside the classroom in a long period. At the end, the two aspects (values and action), are considered to be a limitation in the development of this ILM. In short, that aspect of *be* is a part that should be examined for further research.

Related with determination of ILM on embryology learning, the present moment in the history of higher education requires setting strategies and specific action plans to guarantee a place in the highly competitive and demanding world scenario was describe (Laverde and Cifuentes, 2007). There is the incorporation of information and communication technologies is one of the feasible paths to be considered, but this requires formulating proposals insuring appropriate use of said technologies seeking improvement of education quality. In this research also need some tools regquried to apply the model of ILM.

In others research finding also show that the participants had difficulties understanding pedagogical knowledge (PK), which hindered their learning of integrated knowledge of TPACK and their learning of TPACK was the combination rather than the integration of PK, technological knowledge, and content knowledge (Lee and Kim, 2014). But, others research finding show that highly integrated model assessment technology and tools is web-based and has been shown to scale up for practical use in educational and workplace settings, unlike many of the research tools developed solely to study basic issues in human learning and performance (Dummer *et al.*, 2010).

Conclusion

The prototype of ILM on embryology learning was design and develop with five sections. At assessment phase, the result showed that the prototypes were categorized valid. At implementation, the results showed that eight aspects acquire very practical value. This finding also were reflected in some aspects: design, model construction, learning approach, skills and learning method, and the relevance of ILM as an adaptive instructional system with development in higher education. In conclusion, the relevancy and internal consistency of ILM on embryology learning based on characteristic, validity and observation on learning process.

References

Agostinho S, Bennet S, Lockyer L, Harper B (2003). Integrating learning objects with learning design. Adelaide, ASCILITE Retrivied on http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.538.9889&rep=rep1&type=pdf, pp. 571-575.

Barrett A, Ali S, Clegg J, Hinostroza JE, Lowe J, Nikel J, Novelli M, Oduro G, Pillay M, Tikly L, Yu G (2008). Initiatives to improve the quality of teaching and learning A review of recent literature, s.l.: UNESCO. Retrivied on http://unesdoc.unesco.org/images/0015/001555/155504e.pdf.

Barrett MA, *et al.*, (2006). The concept of quality in education: a review of the international literature on the concept of quality in education, s.l.: EdQual RPC. Retrivied on http://www.edqual.org/publications/workingpaper/edqualwp3.pdf/at_download/file.pdf.

Bredford JM (1975). Maturation, transit and fate of spermatozoa in the epididymis. In: Aswood EB, Greep RO, Eds. Handbook of physiology. s.l.:Physiology Society.

Casares J, *et al.*, (2011). The future of teaching and learning in higher education. [Online] [Accessed 2015].

Cenoz J (2015). Content-based instruction and content and language integrated learning: the same or different?. Lang. Cult. Curric., 28(1): pp. 8-24. DOI: 10.1080/07908318.(2014).1000922.

Cronje J (2006). Paradigms regained: toward integrating objectivism and constructivism in instructional design and the learning science. Educ. Technol. Res. Dev., 54(4): 387-416.

Dacheux E, Dacheux JL (1988). Immunocytochemical localization of anti-aglutinin in boar epididymis. Cell Tissue Res., 252: 329-337.

Dacheux JL, Paquignon M, Combarnous Y (1983). Head-to-head agglutination of ram and boar epididymal spermatozoa and evidence for an epididymal anti-aglutinin. J. Reprod Fertil., 67(1): 181-189. DOI: 10.1530/jrf.0.0670181.

Drake SM, Burns RC (2004). Meeting standards throught integrated curriculum. Danver, USA: Association for Supervision and Curriculum Development.

Dudek RW (2011). Embryology. 5th Ed. Philadelphia: Lippincot Williams and Wilkins.

Dummer PP, Ifenthaler D, Spector MJ (2010). Highly integrated model assesment technology tools. Educ. Technol. Res. Dev., 58(1): pp. 3-18. DOI: 10.1007/s11423-009-9119-8.

Dummer PP, Ifenthaler D, Spector MJ (2010). Highly integrated model assessment technology and tools. Educ. Technol. Res. Dev., 58(1): 3-18. DOI: 10.1007/s11423-009-9119-8.

Elander K, Cronje JC (2016). Paradigms revisited: a quantitative investigation into a model to integrate objectivism and constructivism in instructional design. Educ. Technol. Res. Dev., 64(3): 389-405.

Erdogan T (2011). Turkish primary school teachers perceptions of school culture regarding ICT integration. Educ. Technol. Res. Dev., 59(3): 429-443. DOI: 10.1007/s11423-011-9205-6.

Fastré GM, Van der Klink MR, Sluijsmans D, van Merriënboer JJ (2013). Towards an integrated model for developing sustainable assessment skills. Assess. Eval. Higher Educ., 38(5): 611-630.

Frick TW, Rajat C, Watson C, Zlatkovska E (2010). Improving course evaluations to improve instruction and complex learning in higher education. Educ. Technol. Res. Dev., 58(2): 115-136. DOI: 10.1007/s11423-009-z.

Garner DL, Hafez ES (2000). Spermatozoa and seminal plasma. In: Hafez B, Hafez E, Eds. Reproduction in farm animals. 7th Ed. South Caroline: Lippincot Williem and Wilson, pp. 96-109.

Gay LR, Mills GE, Airasian PW (2009). Educational research, competencies for analysis and application (9th Ed.). New Jersey: Pearson Education.

Govender CM, Taylor S (2015). A work Integrated Learning Partnership Model for Higher Education Graduates To Gain Employment. South Afr. Rev. Sociol., 46(2): 43-59. DOI: 10.1080/21528586.2015.1009857.

Hammerstedt RH, Parks JE (1987). Changes in sperm surface associated with epididymal transit. J. Reprod. Fertil. Suppl., 34: 133-149. PIMD¨3305914 (PubMed-indexex for MEDLINE).

Harayama H, Miyano T, Miyake M, Kusunoki H (1994). Identification of anti-aglutinin in epididymal plasma of boar. Mol. Reprod. Dev., 37(4): 436-445. PIMD: 8011328 (PubMed - indexed for MEDLINE).

Henry B, Kanjee A, Bettinger E, Kremer M (2006). Improving education throught assessment, innovation, and evaluation. Cambridge, MA: American Academy of Arts and Sciences Ltd. Retrivied on https://www.amacad.org/publications/braun.pdf.

Herrington J, Oliver R (2000). An instructional design framework for authentic learning environment. Educ. Technol. Res. Dev., 48(3): 23-48.

Hightower AM, *et al.*, (2011). Improving student learning by supporting qualitiy teaching key issues, effective strategies, Bethesda, MD: Editorial Projects in Education, Inc..

Hunnicut GR, Koppel DE, Myles DG (1997). Analysis of the process of localization of fertilin to the sperm posterior head plasma membrane domain during sperm maturation in the epididymis. Dev. Biol., 191(1): 146-159. DOI: 10.1006/dbio.1997.8700.

Hunter RH, Holtz W, Hermann H (1978). Stabilizing role of epididymal plasma in relation to the capacitation time of boar spermatozoa. Anim. Reprod. Sci., 1: 161-166. DOI: 10.1016/0378-4320(78)90024-6.

Hyerle DN, Alper L (2011). Students successes with thinking map: school-based research, result and models for achievement using visual tolls. California: Corwin A Sage Company.

Iriti J, Bickel W, Schunn C (2016). Maximizing research and development resources: identifying and testing "load-bearing conditions" for educational technology innovations. Educ. Technol. Res. Dev., 64(2): 245-262. DOI: 10.1007/s11423-015-9409-2.

Jhonson HM, Everitt BJ (1995). Essential reproduction. 4th Ed. Oxford: Blackwell Scientific Ltd.

Jonassen D (2006). On the role of concepts in learning and instructional design. Educ. Technol. Res. Dev., 54(2): 177-196.

Joyce BR, Weil M, Showers B (1992). Models of Teaching. 4th Ed. Massachusetts: Allyn and Bacon Publisher.

Ke F (2016). Designing and integrating purposeful learning in game play: a systematic review. Educ. Technol. Res. Dev., 64(2): 219-244. DOI: 10.1007/s11423-015-9418-1.

Kohane AI, Pinicoro L, Blaqueir JA (1987). Androgen controlled synthesis of specific protein in the rat epididymis. Endocrinol., 112(5): 1590-1596. DOI: 10.1210/endo-112-5-1590.

Laverde AC, Cifuentes YS (2007). Toward an instructional design model based on learning objects. Educ. Technol. Res. Dev., 55(6): 671-681.

Lee CJ, Kim CM (2014). An implementation study of a TPACK-based instructional design model in a technology integration course. Educ. Technol. Res. Dev., 62(4): 437-460.

Lewittes H (2015). The identity interview project: Integrating critical thinking, contemplative inquiry

and the curriculum of modern Life. Int. J. Learn. Higher Educ., 21(2): 1-14.

Majeski RA, Stover M, Ronch J (2016). Making asynchronous online learning more learner-oriented: An integrated conceptual model with applications for course design and instruction. Educ. Gerontol., 42(2): 109-119.

Meyer O, *et al.,* (2015). A pluriliteracies approach to content and language integrated learning – mapping learner progressions in knowledge construction and meaning-making. Language, Cult. Curric., 28(1): 41-57. DOI: 10.1080/07908318.2014.1000924.

Nieveen N (2010). Formative Evaluation in Educational Design Research. Enschede, SLO Neth. Inst. Curric. Dev., pp. 89-102.

Park OC, Lee J (2002). Adaptive Instructional System. In: Handbook of Research on Educational Communication and Technology. s.l.: AECT Publishers. Retrivied on www.aect.org.pdf, pp. 1101-1130.

Plomp T (2010). Educational Design Research: an Introduction. Enschede The Nedherland, SLO - Netherlands institute for curriculum development. Retrivied on www.slo.nl/organisatie/international/publication, pp. 9-35.

Reigeluth CM, An YJ (2006). Functional contextualism: an ideal framework for theory in instructional design and technology. Educ. Technol. Res. Dev., 54(1): 49-53.

Richey CR, Klein DJ, Nelson WA (2002). Developmental research: studies of instructional design and development. In: Jonassen D, Ed. Handbook of research on educational communications and technology. 2nd ed. Washington: Assoc. Educ. Comm. Technol., p. 1101-1130.

Sadik A (2008). Digital storytelling: a meaningful technology integrated approach for enganged student learning. Educ. Technol. Res. Dev., 56(4): 487-506. DOI: 10.100711423-008-9091-8.

Sarker F, Davis H, Tiropanis T (2010). A review of higher education challeges and data. [Online] [Accessed November 2015].

Setchell BP, Maddocks S, Brooks DE (1994). Anatomy, vasculature, innervation, and fluids of the male reproductive tract. In: Knobil E, Neill JD, Eds. The Physiology of reproduction. 2nd Ed. New York: Raven Press Ltd, pp. 1063-1175.

Slavin RE (2005). Cooperative learning: theory, research and practice. London: Allyn and Bacon.

Stefani L (2008). Planning teaching and learning, curriculum design and development. In: Fry H, Ketteridge S, Marshall S, Eds. A handbook for teaching and learning in higher education enhancing academic practice. Third edition ed. s.l.: Taylor & Francis e-Library. Retrivied on http://biblioteca.ucv.cl/site/colecciones/manuales_u/A%20Handbook%20for%20Teaching%20and%20Learning%20in%20Higher%20Education%20Enhancing%20academic%20and%20Practice.pdf, p. 40.

Sugar WA, Luterbach KJ (2016). Using critical incidents of instructional design and multimedia production activities to investigate instructional designers' current practices and roles. Educ. Technol. Res. Dev., 64(2): 285-312. DOI: 10.1007/s11423-015-9414-5.

Suparman A (2012). Desain Instruksional Modern. Jakarta: Erlangga.

Tessmer M (1993). Planning and conducting formative evalution. London: Kogan Page.

Tiruneh DT, *et al.,* (2016). Systematic design of a learning environment for domain-specific and domain-general critical thinking skills. Educ. Technol. Res. Dev., 64(3): 481-505. DOI: 10.1007/s11423-015-9417-2.

Vanderhoven E, Schellens T, Vanderlinde R, Valcke M (2016). Developing educational materials about risks on social network sites: a design based research approach. Educ. Technol. Res. Dev., 64(3): 459-480.

Visconti PE, *et al.,* (1995). Capacitation of mouse spermatozoa, correlation between the capacitation state and protein tyrosine phosphorylation. Dev., 121(4): 1129-1137. PMID: 7743926 (PubMed-index for MEDLINE).

Wetzel J, *et al.,* (2016). The design and development of the dragoon intelligent tutoring system for model construction: lesson learned. Interact. Learn. Environ., pp. 1-21. DOI: 10.1080/03601277.2015.1083389.

Williams DD, *et al.,* (2011). How do instructional designer evaluate? a qualitative study of evaluation in practice. Educ. Technol. Res. Dev., 59(6): 885-907. DOI: 10.1007/s11423-011-9211-8.

Yanagimachi R (1994). Mammalian fertilization. In: Knobil E, Neill JD, Eds. The physiology of reproduction. 2nd Ed. New York: Raven Press, Ltd.

Yanchar SC, *et al.,* (2010). Struggling with theory? a qualitative investigation of conceptual tool use in instructional design. Educ. Technol. Res. Dev., 58: 39-60. DOI: 10.1007/s11423-009-9129-6.