Man In India, 97 (11) : 115-126 

# THE EFFECT OF MOOCS INSTRUCTIONAL DESIGN MODEL-BASED ON STUDENTS' LEARNING AND MOTIVATION

Eisa rezaei[*], Esmaeil Zaraii Zavaraki[**], Javad Hatami[***], Khadijeh Ali Abadi[****] and Ali Delavar[*****]

***Abstract:*** The aim of this study was to develop and validate an instructional design model of Massive Open Online Courses. The research method was mixed methods (sequential exploratory). For this purpose, 62 papers related to instructional design of Massive Open Online Course based on purposeful sampling and compliance with the criteria of the study was selected. It analyzed with content analysis method and based on the results, developed an instructional design model for Massive Open Online Course. Then for external validation, results of the proposed model were evaluated based on students' learning and motivation with quasi-experimental methods. The findings showed that the results obtained in the experimental and control groups for learning variables ($F = 34.270.$, $P \leq 0.05$) and motivation ($F = 4.538$, $P \leq 0.05$) had a significant difference. So the hypothesis was confirmed. As a result, the proposed model has good external validity and could be used it for designing an effective Massive Open Online Course. The proposed model of instructional design in this study is MOOCs at micro and macro levels. This MOOCs design model is for higher education levels. However, it also has applicability in different situations.

***Keywords*:** MOOCs, Massive Open Online Courses, Instructional Design Model, E-learning.

## INTRODUCTION

Massive Open Online Courses (MOOCs), most recently have attracted media, entrepreneurs, educational specialists and public sectors technical education (Ghazi MirSaeed, Omati, & Tavassoly Farahi, 2015). MOOCs' aim was developing Massive Open Online Courses available for the applicants to reduce the cost of higher education and changes current models of higher education. Since 2012 MOOCs by the New York Times Magazine was named The Year of the MOOC (Pappano, 2012) and facing with the interest of prestigious universities around the world and converted into a public and academic discourse. Now, many world-renowned universities with different objectives and policies presented MOOCs or set up platform or new courses. According to the Class Central reports (Shah, 2016) the number of MOOCs in recent years almost doubled. The total number of people

[*] PhD Candidate, Department of Educational Technology, Allameh Tabataba'i University, Tehran, Iran

[**] *Corresponding author*, Associate Professor, Department of Educational Technology, Allameh Tabataba'i University, Tehran, Iran. *Email: eisa.rezaei@atu.ac.ir*

[***] Associate Professor, Department of Education, Tarbiat Modares University, Tehran, Iran

[****] Associate Professor, Department of Educational Technology, Allameh Tabataba'i University, Tehran, Iran

[*****] Professor, Department of Education, Allameh Tabataba'i University, Tehran, Iran

who have registered for a period at least had crossed 35 million people. However, the last year statistics were reported between 16 and 18 million.

Researchers believed MOOCs will be provided new opportunities for learners to participate in MOOCs from anywhere in the world without any precondition, pave the way for new development in higher education. However, the design of this course and use of instructional design models in the development of this course is less known (Legon, 2013; Stanley, 2015). Merrill (1998) emphasizes that the use of IT facilities can attract people to the educational programs; while it is sometimes possible in the process, learning outcomes and instructional design destroyed. According to his belief, many web-based training plans not only are educational, but just give information to their users. This is a critique on many MOOCs. In fact, many of these courses, regardless of instructional design principles, focused more on provide information (Margaryan, Bianco & Littlejohn, 2015).

In MOOCs not only techniques of education, but in many cases learners are also different. For example, many learners who enroll in MOOCs may not have much interest for certification or degree (Kop & Carroll, 2011). Most of them participate in this course for various purposes such as improving the professional, personal learning or academic improvement participate in this course. Schellens, Van Keer, and Valcke (2007) showed that the optimum number of learners for proper interaction in online course is approximately 14 people, while in MOOCs the average number of learners is 50,000 people (Jordan, 2013).

The number of learners in distance education and open online course in term of learning standard is quite different and therefore require different strategies and teaching methods as well. It is also expected that participants enrolled in MOOCs for acquire information and not for qualification. The purpose is "pure education" and instructional design should take into account variables and provide a space for those participate for pure education (Scagnoli, 2012).

So, necessarily having the specialist knowledge and proven capabilities of education in areas of traditional education (university, professional workplace) for designing effective MOOCs will not be enough (King et. al., 2014) and to avoid poor design, course designer need to a set of principles to guide decision making and management of course content, technologies, processes, organizational structure, and management on a massive scale. While there is significant research regarding e-learning design principles (Kong and Song, 2013; Zhang et. al., 2011), however, little effort has been made to extract MOOCs instructional design principles. In addition, studies (Kop, 2011; Kop and Fournier, 2010; Kop, Fournier & Mak, 2011; Mackness, Mak & Williams, 2010; Milligan et. al., 2013) show that these principles in the design of many MOOCs virtually is unused. However, we know that design has a significant effect on deep and meaningful learning (Garrison & Cleveland-Innes, 2005). Parry (2010) states that providers of MOOCs, even with

the evidence on the impact of various factors on success, do not know the best way to implement successful MOOCs.

McAuley et. al (2010) also suggest that new forms of education, training and technical characteristics are different, and these differences need to be extended to new learning methodology and framework.

Due to the uniqueness of the MOOCs and less experienced positive results, now, create a set of instructional design principles is vital to improve learner outcomes (Drake, O'Hara, Seeman, 2015).

These principles can improve instructional design for MOOCs and ultimately enhance student learning and retention and completion rates. However, in recent years design principles and development processes of MOOCs has been studied by some researchers (Lim and Kim 2014; Guàrdia, Maina, & Sangrà 2013, Scagnoli 2012; Kukharenko, 2013).

However, most of this research has been done on the basis of the ADDIE model of instructional design and specific model for instructional design such courses is still not provided. This study aim was to investigate the unique features of MOOCs as well as research and evidence of instructional design for MOOCs, these programs offer a model for instructional design and the effectiveness results of it on learning and measure motivation of learners. The study hypotheses are:

- Learning of students in MOOCs is designed by proposed model, is more than students of conventional courses.
- Motivation of students in massive open online course designed by the proposed model, is more than students of conventional courses.

## METHODOLOGY

In this study a mixed and sequential-exploratory method was used. At first to make instructional design models of MOOCs, a qualitative content analysis was used. Then the model was validated qualitatively. In qualitative research methods (qualitative content analysis), statistical population consists of peer reviewed articles from 2006 to 2016 on the topic of study indexed in the Web of science, Science Direct, SAGE Journals, Proquest, Scopus and Emerald Insight and Persian databases such as SID. ir, Magiran.com, Noormags.ir, Civilica, Barekat Danesg Gostar, Iran Namayeh, Ganj database. Sampling method of the population was purposeful sampling.

Saturation parameters according to articles related to the subject of separate research and then under the rule of selection, were analyzed. According to Glaser & Strauss (1967) theoretical saturation, the referee stoppage sampling time of groups related to those categories. Finally, out of a total of 189 articles extracted from different sites, based on purposeful sampling and compliance with the criteria of the study, 62 articles were selected. Criteria for selection of articles included in this study were:

(a) Empirical studies and review articles that focus on designing MOOCs
(b) in the period between 2006 and 2016 have been published and
(c) contain relevant content.

Then the coding semantic units to reach saturation point when the new code was not achieved, continued and based on the results of content analysis, the proposed model of instructional design for MOOCs were offered. As well as to external validation model, the pretest-posttest for control group was used. This means that the course entitled "writing skills and publication of scientific articles" this model as a pilot was designed and implemented. The control group received the same volume without the components of the proposed model. Before starting lessons using research instrument pretest to post-test was carried out and after five weeks posttest started and finally, results of descriptive statistics (mean and standard deviation) and inferential statistics (analysis of covariance) for external validation of model were used. Research instruments for external validation model were researcher made learning and motivation test scale. Validity of learning and motivation test by several professors and specialists was determined. Reliability of learning test by split-half method was 0.76 and reliability of motivation by Cronbach's alpha was 0.85 which was acceptable and accurate.

## RESULTS

For instructional design any system its constituent elements and relationships between them should identified. MOOCs also due to the different nature have a variety of elements that in this study for identification of the elements of an inductive approach qualitative content analysis was used. The results of qualitative content analysis of each code according to similarity and means are put together and were categorized and 9 main categories and 22 subcategories of qualitative data were extracted.

Also qualitative content analysis process in addition to the extraction of categories, executive strategies related to each of these categories were based on the coding was perceived. Designing MOOCs effectively and deployment of these executive strategies as instructional design steps in each stage is essential. Therefore, each component has subcomponents and specific steps that drawn instructional design process of MOOCs. These components and sub-components are shown in Table 1.

Following the model of instructional design of MOOCs were developed based on the results of qualitative content analysis and its effectiveness on learning and motivation variables for external validation were examined. External validation actually means test performance, efficiency and usability of models in a real context. To report the effects of these models, it can be corrected to achieve improvement and identified it with the field test (Ritchie and Klein 2007). Descriptive statistics

**TABLE 1: SHOWS THE MAIN COMPONENTS, SUB-COMPONENTS AND STEPS OF DESIGN MODEL OF MOOCS**

| | *Component* | *Subcomponents* | *Executed Strategies* |
|---|---|---|---|
| 1 | Philosophical and Pedagogical Umbrella | Determine Pedagogy | network-based, course-based, task-based, content-based, blended, SPOC, adaptive MOOCs |
| 2 | Orientation | Needs Assessment | continuous collection of data, social network analysis, identify trends |
| | | Target, Common Interest | identification of stakeholders, analysis of stakeholder's different goal, policy and overall objectives, expected audience goals |
| | | Feasibility | estimates of audience statistics, cost estimating, cost-effectiveness analysis |
| 3 | Analysis | Ecology Analysis | analysis of platform, set up supporting platform, identification of open platform |
| | | Audience Analysis | anticipated prior knowledge, determine the course requirements, taking into account the motivational beliefs, multi-cultural considerations |
| | | Subject or Task Analysis | determine the object, task, analysis academic goals |
| 4 | Content | Organizing | thematic expert group formation, organization structure of the course, determining duration, determining the appropriate academic content |
| | | Preparing Content | collection of open educational resource, e-content production, film production |
| | | Providing supplementary Resources | identify supplementary resources available, observe the principle of diversification of sources, allocation of resources in each part |
| 5 | Networking | Engagement Strategies | determine the interactive space, determining interactive strategies, planning continuous presence, pressure and stimulating factors |
| | | Network Design | determine the learning strategies, determining assignments and activities, determine strategies to facilitate the flow of knowledge, formation of interest groups |
| | | Determine Supporter | empower network strategies, strategies and guidance, team facilitators, supporter |
| 6 | Motivation | Motivational Strategies | elements of the game, scoring system, levels and address, certificate or degree, frequently asynchronous notifications |
| | | Evaluation and Feedback | analysis of learning, peer assessment, e-portfolio, feedback |

| | *Component* | *Subcomponents* | *Executed Strategies* |
|---|---|---|---|
| 7 | Demonstration | Timing | start audience, the beginning and end of the period, repeat period |
| | | Introduction and Informing | introducing the course, instructors, learning, communication strategies |
| 8 | Evaluation | Evaluation and Repeat | evaluation, modification, archiving, replication |
| 9 | Project Management | Planning | define project scope, operation pattern selection, scheduling, budgeting and preparation of action plan |
| | | Organizing | division of labor, assignment, organize resources, create channels of communication |
| | | Coordination | time and knowledge management |
| | | Monitoring and Control | evaluation criteria, provide guidance, feedback |

of learning and motivation variable after implementation of learning course based on the proposed model in the intervention group and pretest and post-test are shown in Table 2.

**TABLE 2: DESCRIPTIVE STATISTICS OF LEARNING AND MOTIVATION VARIABLES**

| *Variable* | *Group* | *Pre-Test* | | *Post-Test* | |
|---|---|---|---|---|---|
| | | *Mean* | *Standard Deviation* | *Mean* | *Standard Deviation* |
| Learning | Control | 7.866 | 3.014 | 12.533 | 2.161 |
| | Experiment | 6.966 | 3.681 | 15.033 | 2.108 |
| Motivation | Control | 113.166 | 12.379 | 122.333 | 15.216 |
| | Experiment | 121.266 | 24.612 | 136.500 | 24.097 |

Table 2 show the average of learning in experimental group in pre-test is equal to 6.966 and in post-test has increased to 15.033 which show change equal to 8.07 scores. But in the post-test scores in the control group only 4.67 score improved. As well as motivation in the experimental group in pre-test which is equal to 121.266 and in post-test increased to 136.500 which represents the change 15. 23 score. But motivation in control group with the difference 9.16 score has increased.

The table shows that the level of learning and motivation after the intervention increased. For this study significantly increased as well in order to control pre-test and post-test on the analysis of covariance was used. For this purpose, according to the analysis of covariance, parametric tests, normal distribution assumption using the Kolmogorov - Smirnov examined and its results for the analysis of covariance

was invoked. Table 3 shows the results of Kolmogorov - Smirnov test for normality of each of the variables.

**TABLE 3: RESULTS OF KOLMOGOROV - SMIRNOV TEST FOR NORMALITY OF EACH OF THE VARIABLES**

| *Variable* | *K-S Statistic* | *Significance Level* |
|---|---|---|
| Learning | 0.106 | 0.091 |
| Motivation | 0.080 | 0.200 |

Kolmogorov-Smirnov test significance level for all variables is greater than the estimated Type I error 0.05 and the result shows that the set scores of research questionnaires, in the Type I error, follow a normal distribution. So using parametric analysis of covariance in order to test the hypotheses is valid.

Then, before covariance analysis, assumptions of the test were examined. Assuming equality of variance of each variable in the study groups (experiment and control) was assessed using Levin test. The assumption in both variables learning ($F = 0.345$, $p = 0.559$) and motivation ($F = 1.601$, $p = 0.211$) was approved.

Table 4 shows the results of variance equality test of scores of each variable between the experimental and control groups.

**TABLE 4: THE RESULTS OF VARIANCE EQUALITY TEST OF VARIABLE SCORES**

| *Variable* | *F Statistic* | *Significance Level* |
|---|---|---|
| Learning | 0.345 | 0.559 |
| Motivation | 1.601 | 0.211 |

Table 4 show that a significant level of variance equality test for any of the variables learning and motivation is larger than 0.05 Type I error and accordingly it can be said that there is equality of variances condition. The homogeneity of regression slopes for learning and motivation variable was not statistically significant and did not intersect lines. Due to lack of significant, homogeneity between the two groups was confirmed. Assuming normal distribution using Kolmogorov-Smirnov (K-S) also showed that assuming normal distribution of variables scores was confirmed. Thus, according to the established assumptions, the hypothesis examined. Table 5 shows the results of univariate analysis of covariance on scores of posttest for learning variable in experimental and control groups, with control pre-test.

Table 5 shows that there is significant difference between learners of experimental groups that were placed under course designed with the proposed model and control groups were not under intervention in terms of learning ($F = 270.34$, $p \geq 0.05$). So the hypothesis known as "students' learning in massive open online course designed

**TABLE 5: RESULTS OF UNIVARIATE ANALYSIS OF COVARIANCE ON SCORES OF POSTTEST FOR LEARNING VARIABLE IN EXPERIMENTAL AND CONTROL GROUPS, WITH CONTROL PRE-TEST**

| *Source* | *Sum of Squares* | *Degrees of Freedom* | *Mean Square* | *F* | *Significance Level* | *Chi Eta* | *Ability Test* |
|---|---|---|---|---|---|---|---|
| Pre-Test | 72.508 | 1 | 72.508 | 21.534 | 0.000 | 0.274 | 0.995 |
| Group | 115.390 | 1 | 115.390 | 34.270 | 0.000 | 0.375 | 1.000 |
| Error | 191.925 | 57 | 3.367 | | | | |
| Total | 358.183 | 59 | | | | | |

by the proposed model, more than the students of *e*-learning courses is common", is approved. In other words, provide training based on instructional design models have been proposed to increase learning of learners. Instructional design models proposed in relation to learning validated externally.

**TABLE 6: RESULTS OF ANALYSIS OF COVARIANCE ON PRETEST SCORES OF MOTIVATION IN EXPERIMENTAL AND CONTROL GROUPS, WITH CONTROL PRE-TEST**

| *Source* | *Sum of Squares* | *Degrees of Freedom* | *Mean Square* | *F* | *Significance Level* | *Chi Eta* | *Ability Test* |
|---|---|---|---|---|---|---|---|
| Pre-Test | 7676.831 | 1 | 813.7676 | 27.560 | 0.000 | 0.326 | 0.999 |
| Group | 1264.138 | 1 | 1264.138 | 4.538 | 0.037 | 0.074 | 0.553 |
| Error | 15877.335 | 57 | 278.550 | | | | |
| Total | 26564.583 | 59 | | | | | |

Table 6 show univariate analyses of covariance grades on motivation in experimental and control groups, with control pre-test. As has been observed there is significant difference between experimental and control group were not placed under the intervention in term of educational motivation ($F = 538.4$, $p \geq 0.05$). So the hypothesis known as "students' motivation in massive open online course designed by the proposed model, more than the students of *e*-learning courses is common", is approved. In other words, provide training based on instructional design models have been proposed to increase motivation of learners. So instructional design models proposed in relation to motivation validated externally.

## DISCUSSION AND CONCLUSION

The results showed that there is a significant difference between the learning ($F = 270.34$, $p \geq 0.05$) and motivation ($F = 538.4$, $p \geq 0.05$) in students who participated in course designed by the proposed model compared with the students who did not participated in this course. So students who participated in this course designed by the proposed model have higher learning and stronger motivation. From

these results it can be concluded that the proposed instructional designed models considering factors influencing the effectiveness of learning and motivation of learners. The results of this study is consistent with the results of Waite, Mackness, Roberts, and Lovegrove (2013), Beaven et. al. (2014), Bouchard (2009), Kop (2011), Petronaiz (2005), Szpunar, Khan & Schacter ( 2013), Wood & Tanner (2012) and Yang et. al. (2013). The researchers in their study have pointed out that the active and cooperative learning enhance learning and motivation in MOOCs. In the proposed model, active learning has been considered and learning actively shapes their knowledge. Waite, Mackness, Roberts, and Lovegrove (2012) studied understanding of novice and experienced learners. In this MOOCs it was not need to check each other's work colleagues or build learning communities, unfortunately, were reflected its negative effect on novice's learners. Information collected from interviews with focus groups showed that a main group of experienced volunteers can undertake responsible for supporting new groups and at the micro level to build community. This proves that learning plays an important role in the MOOCs. Learners can build learning communities, to support each other (especially beginners), to exchange feedback on their work, and work together. In the proposed model determine supporter and support new learners are one of the main components. In the model, the teaching team constantly needs to have a social presence in course so that, increase participation motivation to participate in the course. According to the research Beaven et. al. (2014), a successful MOOCs cooperation, motivation and self-determination to promote the students complete the course. Bouchard (2009) states that success in online learning, is largely depend on learners. Bouchard outlines four factors to help a successful learning experience in MOOCs, these factors include mental issues such as motivation, educational issues such as goals and assessment, and the issues underlying problem (quoted by Fournier, Kop & Durand, 2014). Kop (2011) states motivational factors in a conventional classroom are very important. If the confidence level is low, most likely, connection-oriented person will not participate in a course-based learning. Technology or learning activities can be a barrier (p. 22) ".

Petronaiz (2005) in a study examine structures and barriers facing learners in online learning environments, in this study, an online discussion forum for interaction between learners and Open classes were used. The results showed that online interaction can enhance the motivation of learners. Especially human interaction (with the teacher and the learner counterparts) is the main factor of motivation in the online environment. According to the findings text-based communication, does not preclude the involvement of learners in the forum.

So, according to the results of this study suggest during designing an instructional courses, learners' participation and interaction with peers, teachers and other elements of the learning environment in massively open online course considered more because it has a direct impact on learning and motivation of learners. Using

different exercises and training activities provide the basis for transfer of learning to real-life learners. The final projects in a manner that instructors can provide to learners based on their context respond to them. Also, the effectiveness of different media suggested learners to diverse educational media in the course of teaching. In the process of assessment and evaluation it is recommended learning in designing courses used and the results of each learner to visually understand the panel is visible. This may make social presence in teaching and will promote the effectiveness of course.

**Acknowledgement**

The research described in this paper was extracted from a PhD dissertation titled by "Development and Validation of MOOCs Instructional Design Model Based Connectivism Learning Theory in Higher Education System". The research is conducted in Allameh Tabataba'i University. Foremost, I would like to express my sincere gratitude to my advisors Prof. Esmaeil Zaraii Zavaraki and Javad Hatami for the continuous support of my Ph.D study and research. Besides my advisors, I would like to thank the rest of my thesis committee: Prof. Khadijeh Ali Abadi and Prof. Ali Delavar, for their encouragement, insightful comments, and hard questions.

## *References*

Beaven, T., Hauck, M., Comas-Quinn, A., Lewis, T., & de los Arcos, B. (2014). MOOCs: Striking the right balance between facilitation and self-determination. Journal of Online Learning and Teaching, 10(1), 31.

Bouchard, P. (2009). Pedagogy without a teacher: What are the limits? International Journal of Self-Directed Learning, 6(2), 13-22.

Drake, J. R., O'Hara, M., Seeman, E. (2015). Five principles for MOOC design: With a case study. Journal of Information Technology Education: Innovations in Practice, 14, 125-143.

Fournier, H., Kop, R., & Durand, G. (2014). Challenges to research in MOOCs. Journal of Online Learning and Teaching, 10(1), 1.

Garrison, D. R., & Cleveland-Innes, M. (2005). Facilitating cognitive presence in online learning: Interaction is not enough. American Journal of Distance Education, 19(3), 133-148.

Gayoung, L. E. E., Sunyoung, K. E. U. M., Myungsun, K. I. M., Yoomi, C. H. O. I., & Ilju, R. H. A. (2016). A Study on the Development of a MOOC design Model. Educational Technology International, 17(1), 1-37.

Ghazi MirSaeed, J., Omati, E., & Tavassoly Farahi, M. (2015). MOOC: Ketabkhaneha Dar Asr Amozesh Azad. Tehran: Ketabdar. [In Persian]

Ghazi MirSaeed, Omati, & Tavassoly Farahi (2015) MOOC: Libraries in the era of open education. Tehran: Ketabdar

Glaser, B. G. , & Strauss, A. L. (1967). The discovery of grounded theory: Strategies for qualitative research. Chicago: Aldine Pub. Co.

Guàrdia, L., Maina, M., & Sangrà, A. (2013). MOOC design principles: A pedagogical approach from the learner's perspective. eLearning Papers, (33).

Jordan, K. (2013). MOOC completion rates: The data. Availabe at: http://www. katyjordan. com/ MOOCproject. html.[Accessed: 27/08/2014].

Kauffman, Y., & Kauffman, D. (2015, June). MOOCs Design and Development: Using Active Learning Pedagogy and Instructional Design Model in MITx Courses on the edX Platform. In EdMedia: World Conference on Educational Media and Technology (Vol. 2015, No. 1, pp. 22-27).

King, C., Doherty, K., Kelder, J., McInerney, F., Walls, J., Robinson, A. & Vickers, J., (2014). 'Fit for Purpose': a cohort-centric approach to MOOC design. RUSC. Universities and Knowledge Society Journal, 11(3). pp. 108-121. doi http://doi.dx.org/10.7238/rusc. v11i3.2090

Kong, S. C., & Song, Y. (2013). A principle-based pedagogical design framework for developing constructivist learning in a seamless learning environment: A teacher development model for learning and teaching in digital classrooms. British Journal of Educational Technology, 44(6), 209-212

Kop, R. (2011). The challenges to connectivist learning on open online networks: Learning experiences during a massive open online course. The International Review of Research In Open And Distributed Learning, 12(3), 19-38.

Kop, R., & Carroll, F. (2011). Cloud computing and creativity: Learning on a massive open online course. European Journal of Open, Distance and E-learning, 14(2).

Kop, R., & Fournier, H. (2010). New dimensions to self-directed learning in an open networked learning environment. International Journal of Self-Directed Learning, 7(2), 1e20 [Online] http://www.sdlglobal.com/IJSDL/IJSDL7.2-2010.pdf.

Kop, R., Fournier, H., & Mak, J. S. F. (2011). A pedagogy of abundance or a pedagogy to support human beings? Participant support on massive open online courses. The International Review of Research in Open and Distributed Learning, 12(7), 74-93.

Kukharenko, V. (2013, June). Designing Massive Open Online Courses. International Conference on ICT in Education, Research, and Industrial Applications, ICTERI. (pp. 273-280).

Legon, R. (2013). MOOCs and the quality question. Inside Higher Ed. Retrieved 03 december 2015, from http://www.insidehighered.com/views/2013/04/25/moocs-do-not-represent-best-online-learning-essay.

Lim, K., & Kim, M. H. (2014). A SWOT analysis of design elements of Korean MOOCs. Journal of Digital Convergence, 12(6), 615-624.

Mackness, J., Mak, S. F. J., & Williams, R. (2010). The ideals and reality of participating in a MOOC. In Seventh International Conference on Networked Learning, Aalborg, Denmark.

Margaryan, A., Bianco, M., & Littlejohn, A. (2015). Instructional quality of massive open online courses (MOOCs). Computers & Education, 80, 77-83.

McAuley, A., Stewart, B., Siemens, G. , & Cormier, D. (2010). The MOOC model for digital practice, 1-63. Retrieved from http://www.elearnspace.org/Articles/MOOC_Final.pdf.

Merrill, M. D. (1998). Knowledge objects. CBT Solutions (March/April), 1-11.

Milligan, C., Littlejohn, A., & Margaryan, A. (2013). Patterns of engagement in connectivist MOOCs. Journal of Online Learning and Teaching, 9(2), 149.

Miyazoe, T., & Anderson, T. (2010). Learning outcomes and students' perceptions of online writing: Simultaneous implementation of a forum, blog, and wiki in an EFL blended learning setting. System, 38(2), 185-199.

Pappano, L. (2012). The Year of the MOOC. The New York Times, 2(12), 2012.

Parry, M. (2010). Online, bigger classes may be better classes. Chronicle of Higher Education, 57(2), A1-A22.

Patronis, M. (2005). Motivational constructs in an online learning environment in a UAE university. Retrieved June, 5, 2016.

Richey, R. C., & Klein, J. D. (2007). Design and development research: Methods, strategies and issues. Mahwah, NJ: Lawrence Erlbaum Associates (LEA).

Scagnoli, N.I. (2012). Instructional Design of a MOOC. Thoughts on Instructional Design for MOOCs. Retrieved from https://www.ideals.illinois.edu/handle/2142/44835

Schellens, T., Van Keer, H., Valcke, M., & De Wever, B. (2007). Learning in asynchronous discussion groups: a multilevel approach to study the influence of student, group and task characteristics. Behaviour & Information Technology, 26(1), 55-71.

Shah, Dhawal (2016). By The Numbers: MOOCS in 2015. How has the MOOC space grown this year? Get the facts, figures, and pie charts. Published on December 21, 2015. www.class-central.com/report/moocs-2015-stats/

Siemens, G. (2012). Designing, developing, and running (massive) open online courses. Presentation at The First Unisa International ODL Conference 2012, University of South Africa, Retrieved from http://www.slideshare.net/gsiemens/designing-and-running-a-mooc.

Stanley, L. E. (2015). A qualitative study of instructional design in massive open online courses (MOOCs) (Doctoral dissertation, CAPELLA UNIVERSITY).

Szpunar, K. K., Khan, N. Y., & Schacter, D. L. (2013). Interpolated memory tests reduce mind wandering and improve learning of online lectures. Proceedings of the National Academy of Sciences, 110(16), 6313-6317.

Waite, M., Mackness, J., Roberts, G. , & Lovegrove, E. (2013). Liminal participants and skilled orienteers: Learner participation in a MOOC for new lecturers. Journal of Online Learning and Teaching, 9(2), 200.

Warburton, S. , & Mor, Y. (2015). A set of patterns for the structured design of MOOCs. Open Learning: The Journal of Open, Distance and e-Learning, 30(3), 206-220.

Wood, W. B., & Tanner, K. D. (2012). The role of the lecturer as tutor: doing what effective tutors do in a large lecture class. CBE-Life Sciences Education, 11(1), 3-9.

Yuan, L., & Powell, S. , (2013). "MOOCs and open education: Implications for higher education" n (JISC CETIS white paper). URI: http://publications.cetis.ac.uk/2013/667

Zhang, J., Hong, H.-Y., Scardamalia, M., Teo, C. L., & Morley, E. (2011). Sustaining knowledge building as a principle-based innovation at an elementary school. Journal of the Learning Sciences, 20(2), 262-307.