Original Article

The developing pedagogical and psychological trends and MOOCs: A Systematic Review

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Abstract

Massive Open Online Courses (MOOCs) are web-based platforms that have significantly impacted various aspects of education and learning. This practical and qualitative study was conducted using the thematic synthesis method based on the Atridasterling model. This study investigates the effects of MOOCs on pedagogical and psychological trends in scientific research in international and Iranian studies from 2016 to 2021. Therefore, 125 English and 15 Persian articles were selected and analyzed using the purposeful method and theoretical saturation criteria. The qualitative data were analyzed using MAXQDA 2010. The results showed the effectiveness of MOOCs at the international studies, including the estimated efficiency in learning (Individual learning, learning process, Learning product, Social learning), education (Job skills, Identifying the academic problem, Planning and implementation, Course and educational content), psychological(Self-help skills, Cognitive effectiveness, Functional effectiveness, Life Skills, Motivational effectiveness, positive psychology, emotional effectiveness, Learning Social psychology variables) and pedagogical (Education and higher education processes). The effectiveness of MOOCs in Iranian studies includes the fields of learning (learning efficiency), psychology (improving psychological processes in education), education (improving teaching processes), and technology (promoting digital literacy). Finally, according to the findings, MOOCs can influence many dimensions and the nature of pedagogical and psychological processes.

Keywords: MOOCs, effectiveness, pedagogical strategy, psychological supports.

Introduction

The Internet had a revolutionary effect on the field of education. Massive Open Online Courses (MOOCs) are considered online education platforms evolving using scalable educational technology (Meet & Kala, 2021). They are free online courses for students to attend in learning environments via the Internet (Karnouskos, 2017). The most important event of the history of teaching and learning is accessing this valuable platform that has made significant changes in traditional education and gives meaning to computer training, free learning, distance learning, etc. (Shrivastava & Guiney, 2014). Self-directed learning management is especially vital for learners' MOOCs (Zhu & Doo, 2021).

They are extensive, generally free, and unstructured education courses that serve to start and end the learning process. People choose a topic based on their needs and interests and form a group, then engage in collaborative learning blogs, tweets, and other resources of the digital internet (DeSilets., 2011).

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Benefits of MOOCs include low costs, access to different people in other parts of the world, facilitating participatory processes for education, facilitating and supporting lifelong learning, creating new learning platforms, accessing digital resources, overcoming the limitations of time and place, etc. (Field., 2014).

Disadvantages of MOOCs include lack of structure, problems related to user abuse, the possibility of cheating in educational evaluations, declining completion rates, privacy problems, and insufficient confidence on the part of consumers (Fidalgo-Blanco et al., 2015). There are different types of MOOCs, such as CMOOCs and X MOOCs. CMOOCs emphasize learning based on social and participatory processes. The learning environment is designed so that people actively engage in problem-solving and benefit from peer assessment. The learning environment of XMOOCs is such that people are exposed to the problems and try to solve them. People are supported using videos, texts, etc. XMOOCs are learner-centered, educationally orientated platforms like the educational content management process. The production and launching of courses are tested in different conditions and then implemented. For example, Pomerol et. al. (2015) believe that in designing MOOCs, materials and resources needed in the human field to form and develop MOOCs, explain human duties, receive heterogeneous perspectives of formal education and MOOCs processes, the order and steps of launching MOOCs, and facilities for launching MOOCs courses are among the issues that must be considered. The quality of education courses, especially online courses, should be studied. The review of quality criteria MOOC cycles has been evaluated from various perspectives. Kolowich (2013) describes the quality of MOOCs, the processes of teaching and learning, concepts and topics of education, the information intended for the audience, the presentation, outcome, structure, system, and technology-related issues. Structure, content, management, and utilization should be considered from a systemic and comprehensive perspective. MOOCs supplement education and learning; therefore, dismissing alternative approaches is incorrect. The effectiveness of MOOCs has been determined through numerous studies (Israel, 2015, Conole, 2015, Gamage et al., 2016, Santandreu Calonge et al., 2019, Chen et al., 2017, Terras, & Ramsay, 2015, Shalatska, 2018, Li & Zhou, 2018, Goh et al., 2018, Tiejun 2016, Fang et al., 2019, Setia et al.,2019). However, research has not found a general model of the effectiveness of MOOCs for improving pedagogical and psychological processes. Because of this research gap, designers, politicians, and educational academics have questioned the effectiveness of MOOCs.Researchers without a general and comprehensive model for the effectiveness of MOOCs will be unable to provide actual and tested explanations and analyses of learning and education methods. Summarizing and interpreting scattered study results is a proper way to address this gap. A wide range of research findings on the effectiveness of learning and education approaches are presented in synthesis studies. Cumulative synthesis is a method in conducting research. The content analysis model is used for the effectiveness of MOOCs. The research question is "What are the themes of the effectiveness of MOOCs in pedagogical development and psychological processes?

Methodology

Thematic synthesis is a type of integrated synthesis research. The research stages are according to Cooper's model (2017):

1. Problem formulation and determination of included and excluded criteria

- The research tries to expand the knowledge related to MOOCs and access to open resources for pragmatic brokers by applying the method of content analysis.
- Selected: 237 international and Iranian articles 2016 - 2021
- Limited: The language of the articles in English and Persian
- Articles are electronic
- Type of study: full report
- Electronic sources: Google Scholar, Science Direct, Emerald, ERIC, Scopus, Sage, and Iranian databases such as SID, Noormagz, Magiran, Comprehensive Humanities Portal, and Civilica is used
- Keywords used in this research: MOOCs, MOOCs and learning, MOOCs and education, Effectiveness of MOOCs, MOOCs and Psychology, MOOCs and pedagogy, MOOCs and teachers and for the Iranian studies, the keywords included: MOOCs, MOOCs effectiveness, MOOCs and Education, education and learning, education and psychology

2. Correct use of Boolean logic to create targeted searches such as AND, OR, and NOT key

Operations.

3. Screening: Two stages of screening were performed. In the first stage, the title and abstract of the research and in the next stage, the full text was studied in more detail. PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyzes) was used for screening. The PRISMA steps include identification, screening, eligibility and included:

-Identification: 237 sources were identified

-Screening: 186 sources were separated by reviewing the abstract and title

-Eligibility: duplicate and irrelevant sources removed and 156 sources left

4. Review selected resources

- Resource revision is based on methodology, and results are obtained in selected sources. CASP (Critical

Appraisal Skills Program) standard is used for resource revision. It has three important parts.

- (Section A): Are the results of the study valid?
- (Section B): What are the results?
- (Section C): Will the results help locally?

Each resource should receive 10 points; the first two questions were significant: "Is the goal clearly stated? Is the appropriate methodology chosen?", If it does not bring these two points, the desired source will be discarded. According to the criteria set out in the CASP Standard; Out of 156 full-text sources, 125 English articles and 15 Persian articles were selected. Included: The output of this selection step is 156

5.Syntheses: The thematic analysis is the research method. The research uses Attride-Stirling's thematic analysis model (2001). Thematic analysis is a textual data analysis method in which themes are combined to produce more abstract concepts. It is an approach to recognize, analyze, and interpret qualitative data (Braun & Clarke, 2006). According to Attride-Stirling's theory, content analysis is a valuable aid to create networks and contexts based on textual data. It can also find and summarize a wide range of textual data, making the analysis process easier. It also facilitates the coherence of analysis and presentation. Attride-Stirling's analysis approach is inductive. It is based on creating basic, organizing, and inclusive themes. The unit of textual analysis is paragraph and page. The basic themes include the codes and the main points of the text. After reviewing the entire text, the smallest codes should be recognized and selected as a basic theme. Organizing themes include themes that combine and summarize basic themes. Basic code and concepts should be studied and put together. The researcher should choose a suitable title for each code category according to its resolution and scope. Finally, all-encompassing themes embrace both prominent and emergent themes, as well as the entire text.

Kappa index has been used to check the validity of the data. The Kappa index is analyzed and used when two raters rate the answer and intend to evaluate their agreement.

Results

After isolating and removing similar and identical themes, the results of this study revealed 174 basic theme codes for international empirical evidence and 57 basic theme codes for empirical evidence from Iran, demonstrating the effectiveness of free online courses on pedagogical and psychological processes. The sum of the basic codes combined shows 231. These themes are collected in three categories, including basic themes, 16 organizing, and comprehensive themes.

Table 1 Levels of International Evidence and Experiences on the Effectiveness of MOOCs on Pedagogical and Psychological Processes

Levels of themes extracted from the analysis International evidence					
Analysis unit		**Analysis unit**	**Analysis unit**		**Analysis unit**
Comprehensive themes		**The main organizer themes**	**Sub-organizer themes**		**Basic themes**
M00Cs	Estimated efficiency in learning	Perceived learning	Individual learning	learning process	Strengthen learning strategies Implement learning goals Flexible learning resource Step-by-step learning units attention to learning preferences and excellence Readiness to learn Option-based learning sourcing Personalization and selection in learning activities Seek help learning More speed in earning learning-related rewards Help get extra support in learning New techniques for personalizing learning Perceived learner control Open learning opportunities

M00Cs	Estimated efficiency in learning	Perceived learning	Individual learning	Learning product	The effect of transition on learning outcomes Insights in learning Increased intention to continue learning Improve active learning Promote credible learning Scalable personal learning Improve learning experiences Development of adaptive learning Improve constructive learning Promoting intentional learning Improve understood learning Improve the value of learners' homework Metacognitive activities after learning Self-determined learning Higher perception of learning Promoting learning behaviors Meet personal learning goals High learning efficiency Learn more independently Learner agency Effective in exploratory learning
					Active social presence in the learning environment Collective content evaluation Use peer review Increase teamwork Improved minor role playing Meaningful interaction with peers and coaches Promote collective learning Improve learning interactions

M00Cs	Estimated efficiency in learning	Perceived learning		Social learning	Teacher mastery Diverse evaluation methods Instructor preparation Flexible working hours Prioritization and response management by the teacher Timely teacher feedback Establish guidance mechanisms Different Professional and work interaction between teachers Help the teacher in the new role Supporting the online movement of teachers
M00Cs	Estimated efficiency in training	Educational facilitator		Job skills	Filling the gap between design and implementation in different learning management systems Finding students at risk of dropping out of school Identify students with problems before assessment Resource sharing Effective emergency strategy Academic vocabulary coverage Education for disadvantaged groups The most effective educational strategy Large-scale training

M00Cs	Estimated efficiency in training	Educational facilitator	Teacher activity	Identify academic problems	Integration of course materials and assignments Effective educational design Trans-educational transfer Common understanding of the process Education Designing communication-oriented educational scenarios Exploratory training strategies Better lexical density Interact more with the content of the training course Participate more in Gamification
M00Cs	Estimated efficiency in training	Educational facilitator	Teacher Activity	Planning and impleme ntation	self-supervision self-management Self-disclosure Self-direction Self-reflective Improve self-learning ability Academic pursuit
M00Cs	Estimated efficiency in training	Educational facilitator	Educationa l trends	Course and educatio nal content	Cognitive organization Improve cognitive processing Dynamic cognitive states Systematic thinking Cognitive conflict Awareness of progress indicators Curiosity

M00Cs	Estimated efficiency psychological	Psychological effectiveness	Educational trends		Deep understanding of learner behavior and discourse Efficacy Mastering an unfamiliar and difficult skill Focus on upgrades Focus on prevention Perceived behavioral control Patient safety competencies Peer support behaviors Health promotion and prevention Patient virtual practice Get help Openness to experience Study habits Wide selection Feeling of progress Speed faster Increase student independence risk management Improve clinical performance Tolerating trauma Improve integrated skills Improving the quality of health care
M00Cs	Estimated efficiency psychological	Psychological effectiveness	Self-help skills		
M00Cs	Estimated efficiency psychological	Psychological effectiveness	Cognitive effectiveness		Improve generosity Time Management finding friend Disport Individual development Strengthen creative thinking Help solve the problem Improve critical thinking
					Improve opportunity motivation Improve success motivation Improving inner motivation tendencies Improve personal motivation Improve job motivation Improve autonomy motivation Optimism

			Functional effectiveness		Positive attitude Improve self-esteem Strong intention and positive action-oriented behavior A unique platform to change attitudes
M00Cs	Estimated efficiency psychological	Psychological effectiveness	Life Skills		Improve learner satisfaction Show emotions Provide academic interests Perceived effectiveness Address the user's feelings Preferential attachment
M00Cs	Estimated efficiency psychologi Cal	Psychological effectiveness	Motivational effectiveness		Increase the ability to speak in public Collective decision making Promote the student's social electronics reputation Dealing with collective injuries Cultural studies Create small online communities Increase intercultural competence Improving collective wisdom Deeper pursuits and interactions Creating a participatory community Facilitate social comparison Learners' participation in the cultural field Preferred communication methods of learners Detection of social processes Managing the epidemic process in public health Formable and scalable interaction
M00Cs	Estimated efficiency psychological	Psychological effectiveness	positive psychology		
M00Cs	Estimated efficiency psychological	Psychological effectiveness	Emotional effectiveness		
					Improve resource management and support Use of high quality training materials

M00Cs	Satisfied psycho-social efficiencies	Effectiveness on social components	Learning-social psychology variables		Prepare the discussants Reduce asymmetric discussion behavioral patterns Improved accurate description of prerequisites Having the time required in the curriculum Increase knowledge levels Strengthen information literacy Give corrective feedback Media richness Networking Access to specialists Flow experience Improve the quality of information and course Enhance information navigation Increase institutional encouragement Digital competency promotion Improving e-learning self-efficacy Increase search activities Revealing the exact objectives of the course Diverse evaluation methods simulation Recommend the course to other students
M00Cs	Satisfied efficiencies in education functions	Effectiveness on pedagogical components	Education and higher education processes		
M00Cs	Satisfied efficiencies in education functions	Effectiveness on pedagogical components	Education and higher education processes		

As can be seen in Table 1, the levels of effectiveness of MOOCs in various pedagogical and psychological fields have been determined. It can be inferred that special attention has been paid to this category at the international level. The main reasons for the growth of global research in this field include appropriate contexts, ready and advanced infrastructure, educational and cultural preparations, positive view of technology, lack of bias towards the disadvantages of

technology, and having a scientific perspective. It can also be seen as a turning point in the development of knowledge and hardware infrastructure in implementing innovative education methods, particularly in the field of MOOCs, with the strengthening of research areas and scientific and government support for research in this field. The themes of MOOCs' effectiveness in Iranian experimental evidence are examined in the following. These topics can be seen in Table 2.

Table 2 Levels of Iranian Evidence and Experiences on the Effectiveness of MOOCs on Pedagogical and Psychological Processes

Levels of themes extracted from the analysis Evidence of Iranian studies				
Analysis unit		**Analysis unit**	**Analysis unit**	**Analysis unit**
Comprehensive themes		**The main organizer themes**	**Sub-organizer themes**	**Basic themes**
M00Cs	Estimated efficiency in learning	Efficiency in learning	Beneficial components in effective learning	Effective in learning and memorizing students' Quran lessons Increase continuous learning Emphasis on active learning Improve the learner's ability to change the course order Manage learning interactions Improve pivotal learner processes Support for learning success Ability to learn through media Use different media to learn
M00Cs	Estimated efficiency psychological	Psychological effectiveness	Promoting psychological processes in education	Enrich performance Provide new and useful ways of thinking Change perceptions and attitudes Improve academic performance Increasing academic engagement Improving job prospects Charm Promoting Behavioral Intention Improve waiting effort Improve the ability to express your moods Continuation of motivation when the teacher is not present Cognitive conflict Motivational conflict Behavioral conflict Pay attention to Iranian

				differences Academic Adaptation Students with Attention Deficit / Hyperactivity Disorder Improve performance expectation
M00Cs	Estimated efficiency in education	pedagogy effectiveness	Improve teaching processes	Promoting a pedagogical attitude towards technology Improved group speech Program management Increasing the relationship between new knowledge and knowledge with previous cognitive structures Strengthen participation in discussion groups Complement valid courses More student support by the teacher Powerful evaluation methods Enrichment of education Learn more about specific topics Possible future business development Easy access to content The right time to study Update knowledge Enrichment of free resources Flexibility of study resources Accuracy of assessments Increase theoretical knowledge Formal recognition of success and professional development Facilitator terms
M00Cs	Estimated efficiency	Information	Promoting digital	Improving the level of information and digital

	in technology	effectiveness	literacy	literacy of professors Ease of use of digital content for all learners Attract IT specialists for knowledge-enhancing courses Providing a learning environment with Internet technology Ability to understand multimedia curriculum content Ability to take notes by watching computer video Ability to complete work despite network disruptions

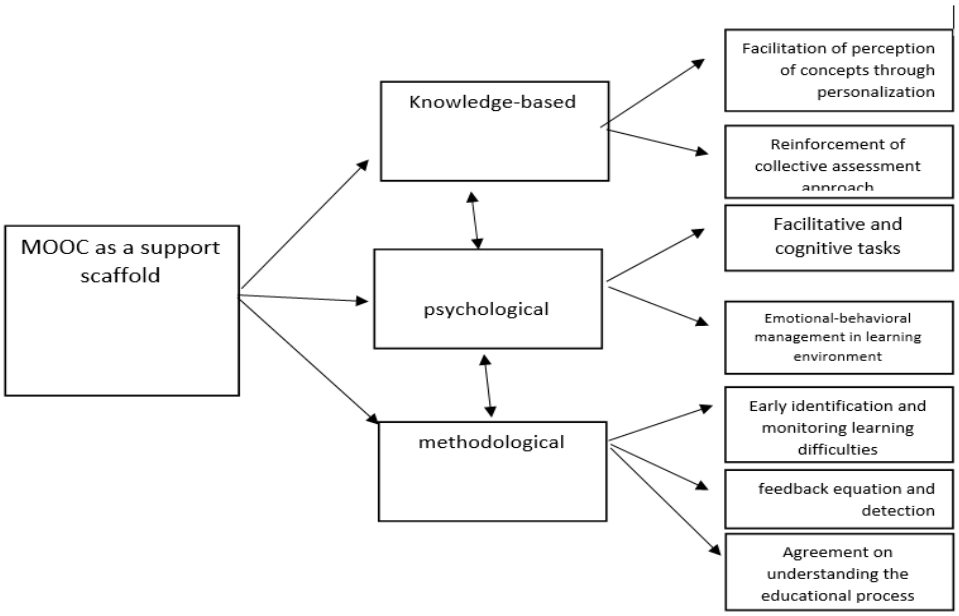
We may conclude from studying and comparing Iranian data with international experiences that most Iranian research has been conducted on educational effectiveness. In psychological fields, there has been less comprehensive research that can quantify and evaluate the usefulness of MOOCs. The paucity of scientific and financial support in this area is one of the causes. Other factors could include skepticism about the use of technology in psychological and educational interventions, as well as the ineffectiveness of these courses in terms of enhancing people's psychological efficiency. One of the main issues that has been addressed in Iranian research is the information efficiency of these courses, which has been less addressed in the international evidence. In the field of education, the number of studies conducted in international experiences is higher than in Iran, which could be attributable to the more equipped and modern infrastructure as well as the acceptance of students doing these courses. In the analysis of Iranian evidence, we can point to the lack of application of technology-based and digital education, which can cause many problems in the education system in times of crisis and emergency. Thus, addressing the effectiveness of these courses in learning, especially combined training, seems to be significant.

The kappa index is between zero and one, and any value of this index closer to 1 indicates the desirability and the degree of agreement between the raters. The kappa coefficient obtained in this research is 0.795, which is higher than the acceptable value for reporting the agreement (0.6). Therefore, the hypothesis of independence of the obtained codes is rejected, and the obtained codes are reliable.

Discussion

The present study was conducted on the effectiveness of MOOCs in developing pedagogical and psychological processes based on international and Iranian empirical evidence. The results showed that the effectiveness of MOOCs at the international level includes the estimated efficiency in learning, education, and psychology. This finding is based on the results of Lee et al. (2022), Zhu & Do (2021), Fan et. al. (2021), Rhodes et. al. (2021), Kim (2021), Dan (2021), Anah et. al. (2021). In addition, when assessing the effectiveness of MOOCs in Iran, the estimated efficiency considers learning, psychology, education, and technology. These findings are based on the results of studies by Farzan et. al. (2012), Dortaj & Dehrize (2019), Zeinabadi & Mousavi Amiri (2018). Theoretically, Siemens (2005) believes that MOOCs are dependent on the connectivism theory. Learners are in control of the created knowledge, distributed at all levels through which the learner is involved in the knowledge creation and distribution and sharing of information. It can be stated that MOOCs have created a platform for improving the processes and original goals of education in all dimensions. On the one hand, this allows the learner to learn to control and strengthen independence and self-efficacy. On the other hand, teachers and education professionals have benefited from having a variety of different capabilities as a supportive approach and tool. They use these resources to fill in educational or skill gaps and take effective steps to institutionalize educational content further and facilitate learning. Aligning with the theory of educational justice, they also provide countless capabilities and opportunities for more people to access education and educational content.In line with the research result and the findings, the researchers have developed a conceptual and abstract model of the combination of levels of analysis which can be seen in figure1.

Figure1 Conceptual and abstract model of the combination of levels of analysis



The developed conceptual model can be explored in several aspects.

.1) MOOC has been able to go beyond just a context and give the authority and command of learning and teaching to its owner, i.e., the learner in the knowledge-based aspect. This process has been achieved through personalization and determination and the learner's discretion in learning. The combination of essential components for learning provided in the context of MOOC makes the perception of knowledge-based concepts easy for the learner. It enables the learner to learn in their style. Style refers to a preference for learning and teaching activities which involve learners in constructing educational objectives. On the other hand, collective assessment is provided as a fundamental component in which the individual feels fairness about being in the test position. Discrimination or partiality of the professors and teachers is minimized in this method. The transparency in the design and implementation of testing highlights this educational context.

.2) In the psychological aspect, the improvement of cognitive processes such as cognitive conflict and self-monitoring, among the basic requirements of metacognitive skills, possesses more power in MOOC contexts. Because in the MOOC environment, the individual enjoys more discretion regarding learning processes through individual and collective perceived learning. On the other hand, participating in the learning processes encourages confidence, effective communication, teamwork, empathy, and conflict resolution and manages their emotions more.

3) In the methodological aspect, identifying academic failure and monitoring learning in MOOC are achieved faster because the individual's educational records are always available. The smallest changes and reaching the critical point in learning can be predicted and intervened. Also, in MOOC, the feedback equation and its detection are equally received and felt by all, highlighting the aspects of educational justice. Moreover, ambiguities, challenges, and problems, which might arise in the learners due to the misperception of the educational process, are managed and adjusted through MOOC. This accurate understanding of the educational process is influential in various exhaustive psychological and knowledge-based areas.

4) Recommenders can suggest a list of periods by examining the user behavior sequence and help self-direction users.

The point of difference between the research findings and the valuable findings of the previous studies can be revealed in the conceptual model presented by the researchers. Because in this model, MOOC moves away from being merely a technology-based structure and as a scaffold supports the learner in teaching and learning, each element of which, like an efficient cycle, is thought-provoking and effective towards other necessary aspects of learning.

Conclusion

one of the undeniable effects of MOOCs is in this learning environment, any learner of any skill or capacity can respond to their needs and move at their own pace. This innovative strategy, which has strong empirical support, is appropriate for eliminating educational inequalities and related factors. The issue of educational equality is to support the education and learning of vulnerable people, such as immigrants, women, people with different subcultures, adolescents, and learners with special educational needs. Also, based on theories related to pedagogy and andragogy, MOOCs create

opportunities such as participation and active learning companionship based on learning needs and goals, the relationship between previous knowledge structures and new knowledge, learning methods, and strategies for learning management, the capabilities of mastery of formal and informal education, enhancing one's self-leadership skills, improving digital literacy skills, increasing self-esteem, increasing learning insight, and a variety of other skills such as time management. The most important property of MOOCs is that they stimulate people to learn more about their environment at the same time. According to the generation gap theory, one of the characteristics of digital natives is the simultaneous reception and analysis of environmental stimuli, so MOOCs are an attractive environment for them to learn. The recommendations based on the research findings are as follows:

- Organizations and institutions involved in education and learning can use MOOCs as innovative and technology-based methods in applied fields of education and research gaps.
- Government and non-governmental organizations can use MOOCs to empower individuals in line with organizational goals based on international standards. So this free resource platform can help save resources and costs.
- Providing resources and infrastructure required for feasibility study and launching MOOCs-based courses in higher education and educational systems.

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