The Disruptive Power of Massive Open Online Course (MOOC)

Richard Hannis Ansah, Ogechukwu Vincentia Ezeh, Tan Seng Teck, and Shahryar Sorooshian

***Abstract*—While MOOCs (Massive open online courses) have ignited debate in both academics and practical spheres of learning, there seem to be an absence of integrated approach for ethical conduct, as well as for course design, management, and certification. This paper remarks that systematic approaches, models and best practices for designing, delivering and managing MOOCs would offer a solution to dealing with the technological and pedagogical issues. A few cases of insights have been highlighted for developing and maintaining the real value within specific institutional strategies and implementation. Moreover, a call is made for scientific studies that would unveil comprehensive strategies to reap the full potentials of MOOCs. This article is expected to shed light on the complexities of the MOOCs system as well as to support the development of an ethical and unified discipline, in which all MOOCs developers and institutions are accountable.**

***Index Terms*—Education, elearning, issues, MOOCs, disruptive, integrated approach.**

I. Introduction

Although considered as the latest trend in eLearning with huge potentials [1], Massive Open Online Courses (MOOCs) have received extensive criticism since its appearance in 2008 [2]. As MOOCs become more popular, the issues in the MOOCs ecosystem also become more pronounced. For e-Learning professionals, there are certain key issues that need clarification and consideration before a course should be launched. Such a borderless concern requires rethinking, with a global collaboration from developers and institutions to rid issues of the MOOCs ecosystem to ensure reliable eLearning and future higher education. While it presents an alternative method of online learning, there are still doubts which make individuals more reluctant to embrace. Clearly, the technological and pedagogical systems need refinements to improve open teaching and learning. Understanding how, why and through what processes and by what means MOOCs are used and affect learners, is still a major challenge. As a phenomenon, one would wonder whether the hype it has received is from the substantial contribution to the development of intellectual discourse, or a promise of an emerging elearning technologies [3]. Even so, as an emerging massive online learning research laboratory, there are still some gaps such as ethical hurdles for quality, data protection concerns, a tendency to hoard data conspire to curtail data sharing [2]. This paper comments that systematic approaches, models and best practices for designing, delivering and managing MOOCs would offer a solution to dealing with the technological and pedagogical issues it faces. A few cases of insights have been presented for developing and maintaining the real value within specific institutional strategies and implementation. Moreover, a call is made for scientific studies that would unearth the strategies to harness the potentials of MOOCs. This article is expected to shed light on the complexities of the MOOCs system as well as to support the development of an ethical and unified discipline, in which all MOOCs developers and institutions are accountable. With such a perspective, the paper contributes to MOOCs literature.

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II. MOOC: Definition, Growth, and Types

Platforms such as Coursera, Udacity, and EdX have brought higher education institutions and professors together in a single most important experiment in higher education to contribute to open education [4]. It involves an evolving ecosystem of open learning with a wide range of designs from Connectivist; networks of distributed online resources, to Extended; structured pathways centralized on open source or proprietary platforms. It is a new educational vehicle designed to disseminate knowledge at an unprecedented scale [5]. The current statistics stand at 58 Million Students, 700 Plus Universities and 6850 Courses [6]. Typically, they are an extension of the technological and institutional opportunities available in the wider landscape of online learning. Institutionally, MOOCs are offered by an array of providers such as Coursera, EdX, XuetangX, FutureLearn, Udacity, Open2Study, P2P University, etc. [6], [7]. Technologically, it represents a move from conventional, text-based platforms to multimedia platforms with interactive and built-in assessment tools 7. Beyond these features, MOOCs vary widely. Some are completely automated, with some level of variations; others involve “live” facilitators actively interacting with the audience. Some are on-demand or self-paced; others have fixed start and end timelines, and impose cutoff dates designed to keep all learners working on the same course at the same time. Some are tuition-free by definition; others are fee-based add-ons, like statements of completion or credits [5].

In order to fully appreciate MOOCs, the growth,

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classifications and their dimension and aspects have been highlighted. However, broader classifications and their distinctions could be found in the work of Major & Blackmon [8]. Understanding of the definition, the growth, the various types or classification and their differences would influence decision makers' directions of MOOCs' future development. Also, they are important to scholars and researchers who need to understand the diverse forms and shapes to make meaningful predictions, innovate new strategies and models, evaluate their potentials, and measure whether MOOCs are meeting their claims or living up to their criticisms. Even so, they inform students who are interested in enrolling in a course, as students who take e.g. xMOOCs may have a significantly different experience from those who take cMOOCs [8]. The Fig. 1 and 2 illustrate the growth of MOOCs and the course distribution by subject respectively.

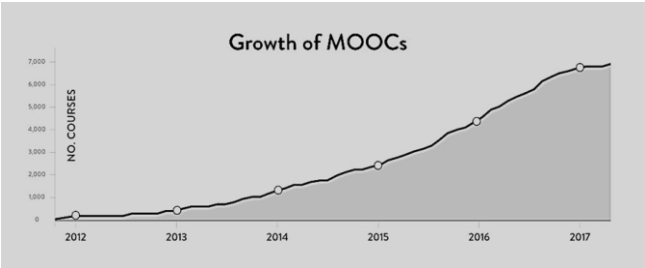

Fig. 1. The growth of MOOCs [6].

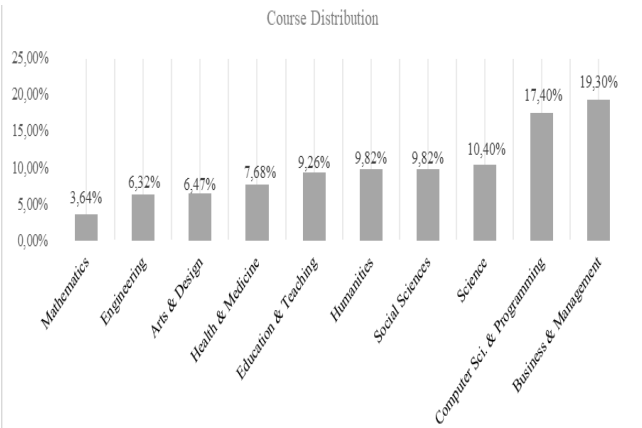

Fig. 2. Course distribution by subjects [6].

III. Types of MOOCs

There are contesting views about the types of MOOCs. According to HRK [9], the types include cMOOC (Connectivistic/Constructivistic MOOC), xMOOC (Extended MOOC), bMOOC (Blended MOOC), SPOC (Small private online course), and smOOC (Small OOC). However, the types/classification by Major & Blackmon [8] including Siemens' classification and Clark's taxonomy are referred in this paper.

In the Siemens' Classification, MOOCs are categorized into two main types: Connectivist MOOCs (cMOOCs) and Extended MOOCs (xMOOCs) based on Knowledge Approach. Similarly, Clark's Taxonomy grouped MOOCs based on Organizational/Institutional Approach. Here, there are eight main types of MOOCs: transferMOOCs, madeMOOCs, synchMOOCs, asynchMOOCs, adaptiveMOOCs, groupMOOCs, connectivistMOOCs, and miniMOOCs. According to Major & Blackmon [8], these types/classifications have dimension and aspects that are essential for knowledge of MOOCs as an instructional form, Table I.

TABLE I: Dimentions and Aspects

Dimension	Aspects
Affiliation	Hosted by companies or universities, Universities run independently, No affiliation
Accessibility	Open (open to anyone at any time), Open and closed (open to anyone at specific times), Closed or private (open to certain people at specific times)
Duration	Long term (15 weeks or more), Medium term (6–15 weeks), Short term (less than 6 weeks).
Timing	Synchronous, Asynchronous.
Relation to knowledge	cMOOCs, xMOOCs
Content	Fixed, Emergent
Structure	Linear, Adaptive
Authority and control	Teacher-centered/driven, Learner-centered/driven
Participant	Individuals, Groups.
Pedagogy	Traditional, Innovative

IV. Issues with MOOCs eLearning

The very description of what MOOCs 'stand for' alarms technical and practical misconception. With such a confusion, most critics have argued for a redefinition. Some argue that every letter in MOOCs is negotiable, and such a variation has heightened misunderstanding of MOOCs. Whether these arguments are admissible or not, the diverse perspectives represent intellectually important and stimulating debates about the future of eLearning and may contain some imports which should be mulled over. In any case, MOOCs seem to satisfy a worldwide thirst to the 21st century personalized and lifelong learning [10]. And, when designed well, it will be a participatory learning platform which provides learners with the opportunity to engage one another and share opinions about a particular subject.

A. Massive

This indicates that MOOCs are offered to a huge number of concurrent learners. Whether or not there are a limit and subsequent implicit imports, there are some issues such as course design, registration, management, and tracking of such volume of learners' progress. The target audience may come from multiple environments and backgrounds (beyond the academic or corporate training environment); such a hugely diverse and heterogeneous audience need resources to handle. Instructional strategy and assessment type are critical to such needs. With its wide scope, meeting the instructional needs of learners is increasingly difficult, thus limiting developers to a "One-Size-Fit-All" approach [11]. In the

words of Lane and Kinser, MOOCs are referred to as the "McDonaldization of higher education," which means "thousands of learners across the world taking the same course, with the same content, from the same instructor" [8]. In designing the courses, content and context must be inclusive, addressing to different target audiences. Perhaps, different versions of the same content, in a different context would be helpful. Hence, in extending MOOCs globally, localization of original courseware to be offered in different languages is essential.

Also, course participation and completion need a rigorous assessment ranging from peer group evaluations to automatically graded assessment [11]. It has been indicated that learners' participation begins to drop from the first week of attendance and the completion rates could be as low as 7% [12], or high dropout rate around 90% [13], [14]. These are attributed to the lack of interaction or cooperative activities [13]-[15], the level of learners' satisfaction, the fact that MOOCs are for free, or completion is not important [11], or learners have different motivation such as looking for specific piece of information [16], or just want to try it [4]. Although completion rates are not completely meaningless, MOOC is massive whether a course is completed or not. Massive does not necessarily mean the number of learners taking or completed the course, it could also mean the number of learners who could take the course. Audiences have different learning habits, expectations, and motivations to completing a course. To some learners, MOOC is a supplementary learning platform or just a place to look for a piece of information, thus does not necessarily point toward a commitment to course completion. At least, MOOCs are massive in theory because they offer unlimited access to participation [8], [17].

B. Open

Whether open registration, open content, free online course [17], free access or free education, open pathways, elude precise description. It is not entirely free; the course development entails a significant amount of investment with potential huge end results if promoted correctly; a new branded product for academic institutions and private companies [18]. Categorically, MOOC is considered as a business model which tries to "commodify" eLearning and exploit for a sum. The reason is that there are situations where learners make payments, and this raises questions of whether payments should be mandatory for MOOCs [19]. A policy of this nature would pit against the commitment to open access which is the hallmark of MOOCs. Nonetheless, one would not strongly argue against payment for certification or statement of completion. The argument here is that variations exist in MOOCs; some courses are open or close and others are simultaneously open and closed [8]. Moreover, the development of MOOCs is expensive.

C. Online

MOOCs are certainly web-based learning system. With such a system, it can either be synchronous or asynchronous [11]. While MOOCs mainly use asynchronous learning methods, there are cases where synchronous features are used. Other collaborative learning methods that could be helpful include wikis, online discussions, blogs, individuals and group e-portfolios, among others. It is certain that self-studies require self-discipline and commitment. Mostly, for asynchronous MOOCs, students may not have sufficient motivation to keep up with their online content. However, in synchronous eLearning, this is part of the instructor's duties. One of the largest issues MOOCs face is their impersonal nature. That is, thousands of learners enroll in a single section, with a single instructor. The instructor is sometimes a facilitator rather than the course designer, and other times the instructor is absent altogether [4]. There must be a clarification and probably integration where such learning methods (i.e. synchronous or asynchronous) offer best possible opportunities and benefits, e.g. bMOOCs [9].

Ideally, in the traditional learning environment, learners learn from feedback and correct future mistakes through the feedback they receive from their instructor. Sadly, in-depth feedback is absent in most MOOCs. Many facilitators are unable to correct thousands of papers a week, and without a tutor, some learners find themselves making the same mistakes repeatedly, even with the automatic feedback from interactives or quizzes provided by MOOCs [4].

D. Courses

MOOCs vary so much in form, structure, content, timing, among others [8], and due to this several questions are raised with regards to a common instructional design, management, and certification. There are no systematic approaches, no models or best practices for instructional design [5]. Nevertheless, the "One-Size-Fit-All" approach according to Keramida [11] hardly produces the best results. A valid, standard and appropriate pedagogy instructional design would reap many benefits. As online courses, issues relating to the suitability and qualitative standards should be embedded in the courseware system. It is said that unqualified instructors or those with poor teaching practices can easily hide behind online [14]. In the theories of pre-MOOCs, it is proposed that learner-instructor, instructor-content, learner-content, and learner-learner interactions be fundamental to the learning environment [7]. Whether MOOCs would be offered as an Instructor-led or self-study and what role should instructor play still needs clarification. Also, whether a course would be accredited or certified is increasingly debated among different MOOC platforms. Most of the course providers and institutions have no system or verified credential recognition [14], [20]. Although there is wide and varied view about the instructional guidelines for MOOCs accreditation, providers should stimulate learners with valid credentials after course completion and examination. Furthermore, there are still tracking and course management issues despites efforts to resolve these issues. Thus, the need for reliable registration, tracking, and management systems.

V. Ethical Practice and Legal Issues

Ethical consideration is crucial for ensuring the public trust in the MOOC system. As providers and higher education institutions tackle social and globally complex challenges, technical and ethical hurdles should be at the core of their objectives. Both the providers and institutions must

acknowledge the importance of managing MOOCs for ethical practice in terms of quality, data protection, and data sharing, among others. There are legal implications for legislation governing copyright, state aid, data protection, examinations, among others, which need clarification. For instance, a clear legal classification between students (internal) versus the general public (external) or cost-free versus chargeable [9]. An understanding of strategies that promote and improve the ethical development of MOOCs systems would offer trust and reliability in the system. Similarly, quality assurance for the delivering of MOOCs could be guided by eLearning quality criteria, which relate to the correctness and content, planning of the course, usability, design of the media as well as the use of qualified instructors.

VI. Perception of MOOCs

While MOOCs are sometimes perceived to have low value as compared to university degrees, they are also considered to be competitive to university attendance. These raise questions about the future of instructor-led classroom, virtual or physical, the worth of university degree earned online as compared to that earned at a university campus, and about whether they are really equivalent to university course or not. The answer depends on how they are offered, through what organization, to what time, etc. To some developers, they are not another online course or a classical academic course or selective open online courses (SOOCs), or small private online courses (SPOCs), rather they are a new instructional genre, in between an e-textbook and a successful university course [8]. However, advertising MOOCs as supplementary and lifelong learning may address such concerns.

Besides, some professionals are worried about the adverse repercussions to teachers. Teachers earn supplementary income from textbook writing, research, and extra teaching assignments, conversely, instructors are developing, teaching, and providing digital textbooks for free. Typically, this scenario could lead to salary adjustments or even switch in jobs as instructors or designers do more for free [4]. In any case, MOOCs satisfy Honeyman's concern, which is to reconsider the underlying premise that perhaps most people would never study in the traditional classrooms, therefore the need to significantly change our classrooms [5]. Yet, as professionals and researchers try to find innovative ways to expand MOOCs, such a concern with increasing effect in the academic sphere must be addressed.

VII. MOOCs As a Disruptive Force for Future Learning

MOOCs are described as a game changer, paradigm shift, a tsunami and a disruptive force to both online tertiary and place-based education [21]. MOOCs are not devoid of controversial issues, however, the sudden take off of MOOCs in 2011 indicates most transformational and disruptive phenomena, which is a perfect storm of its readiness; infrastructural readiness, right format, right topics, right medium, and others. With its emergence in the corporate environment for skill development, increased demand for distance learning, hot topics like artificial intelligence and machine learning, the scarcity and rising cost of education, among others, MOOCs are gaining momentum across timeframes and geographical boundaries, making them a powerful disruptive force in education and the global market. For instance, MOOCs could lead to good participation when "window shoppers" have been eliminated. They could lead to innovative teaching, encourage peer learning, synergy effects from networks and multiple uses, ensures diverse sustainable options for learning, flexibility, self-reliance, self-organization, lifelong learning with programmes for popular disciplines with a very well-established curriculum. Besides, MOOCs could be applied for university marketing, transitional programmes, standardized mass lectures, blended formats, seminar-like options, minor subjects and interdisciplinary courses. It encourages internationalization with global mobility and competiveness, cultural diversity and serves as an instrument for collaboration with business. The quality of teaching is more transparent, could serve as innovative and supplementary format and prompts for strategic positioning of the universities [9].

VIII. Integration

MOOCs are emerging technology with potentially disruptive and revolutionary implications for higher education but without a defined plan for reaping that potential [9]. Although some efforts have been made to address the challenges in the MOOCs system, more need to be done as the said challenges are increasingly pronounced. With such a perspective and description, those challenges need to be reconsidered in one's instructional design. Understanding MOOCs on both micro and macro levels is largely possible through the assessment of dynamics, changes, and perspectives in both theory and practice, as the understanding of the factors and the new dynamics, provides professionals and researchers with a broad scheme of programs, policies, implications, experiences, practices, and perspectives that will facilitate the development of MOOCs. The critical question that must be asked is "how should/does a provider or institution combats the challenges facing MOOCs, and at the time coping with externalities of eLearning disruptiveness, and preserving the underlying goal of MOOCs? Similarly, Ebner5 highlighted some significant questions that need to be covered in one's course design and management:

- Can we provide the same quality of education using MOOCs format that the field provides in its traditional and online (small scale) classes?
- Can the signature pedagogy, the experiential learning model, be implemented in MOOCs?
- Can we provide students in MOOCs the same experience that has made courses popular and successful with classroom students, complete with high volumes of meaningful personal interaction?
- Assuming positive answers to the above questions, what implications might this have for eLearning? What strategies could be considered? And, how could this affect universities and programs?

Generally, any approach or recommendation should be purposefully designed towards such questions and how to

answer them. Similarly, ethical practices are simultaneously required on the technological, pedagogical and research fronts. To guarantee success and reap its disruptive potentials, standardizing MOOCs and using blended approaches that try to combine the advantages of both traditional and virtual learning principles would offer many benefits.

IX. Conclusion

MOOCs have been lauded as a potentially disruptive force for making higher education scalable, free or affordable to interested students. For the discussion, it was discovered that MOOCs have witnessed a tremendous growth right from its introduction to date. However, scaling face-to-face interaction and making it attractive with tangible and valuable benefits would upscale the disruptiveness of MOOCs. Besides, an integrated and focused research approach that support qualitative and ethical standards, course design, management, and certification are needed. It was observed that MOOCs have been misinterpreted. While some argue based on the narrow interpretation, others focused on the broad interpretation. For instance, Massive means an unlimited number of participants (Narrow) or many participants, starting at 100 (Broad). Open means freely accessible to everyone at no charge (Narrow) or openness in terms of learning goals, choice of subject and form of participation (Broad). Online means online learning - online teaching only or blended learning - a mix of online and classroom teaching (Broad). Course(s) means course-like organization (Narrow) or emphasis on community, communication, collaboration-C3 (Broad). Critics should understand that the scientific knowledge of MOOCs is still at an early phase; a work in progress. Yet, understanding of the key trends and debates is crucial for guiding MOOCs toward qualitative and ethical standards. Although MOOCs are not in competition with university courses, they should be considered in the broader spectrum of educational modalities. The quality assurance, standards of teaching, documentations of performance, verified examinations, certification and the recognition of grades need appraisal and improvement. Clearly, integrated approaches with minimal effects in the academic sphere are required to expand MOOCs; a comprehensive MOOCs' approach that develops the full potential and maximizes MOOCs within qualitative limits. Emphatically, a blended approach is critical to the MOOCs' transition, however, any initiative, modality, approach, and solution need not hobble the traditional or eLearning community.

Conflict of Interest

The authors declare no conflict of interest.

Author Contributions

RHA and OVE wrote the first draft and TST and SS have improved and edited the work.

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