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The Characteristics of MOOCs Learning and Its Implications for Schooling

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The paper investigated the characteristics of massive open online courses (MOOCs) learning and drew some implications for schooling. Facilitated by the information technology, the booming trend of MOOCs has attracted millions of participants, often called "MOOCers." This trend is also a cultural phenomenon with new characteristics of MOOCs learning worldwide. An extensive amount of MOOCs-related research has published but analyses of the actual characteristics of MOOCs learning remain relatively rare. This deficiency has prompted this investigation to fill the existing research gap and explore the possible impact of MOOCs on education. Through literature review, the paper has found four primary characteristics of MOOCs learning: virtuality, informality, advantage and unsettledness. By way of critically examining these characteristics, the current study constructed four arguments: the reminiscence of presence, the need of recognition, the missing of voice and the target of the market. Finally, four implications were made for schooling: the virtual characteristic expanding and shifting the learners, the informal characteristic enriching the definition of schooling, the advantaged characteristic creating a need for educational justice and the unsettled characteristic serving as a challenge and an opportunity.

Keywords: massive open online courses, learning, characteristics, schooling, online teaching

專論

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> *What happens to learning when we move from the stable infrastructure of the twentieth century to the fluid infrastructure of the twenty-first century, where technology is constantly creating and responding to change? (Thomas & Brown, 2011, p.17).*

The answer is very simple—a new culture of learning, and it is a cultural phenomenon underlying the experiences of a large number of people with endless resources and unlimited connected online agencies (Thomas & Brown, 2011).

The information and communication technologies are influencing our society in myriad ways (Popovic, Markovic, & Popovic, 2016), and the Internet is a continuously expanding phenomenon that is rapidly penetrating a huge variety of different societies and cultures (Glassman & Burbidge, 2014). Educators should be aware of this trend (Siemens, 2006) and "learning to change" (Institute for Education, UNESCO, 2003, p. 9). Facilitating by the information technology, the ideas and practices of schooling have been innovated, and the booming trend of MOOCs learning over the world is a good example. MOOCs have gained so much media coverage (Fink & Inkelas, 2015) and has enrolled tens of millions population (Lin, Lin, & Hung, 2015; Randall, Harrison, & West, 2013). Typically offered at little to no cost, with minimal barriers to entry or exit, MOOCs have attracted diverse group of learners (Liyanagunawardena, Lundqvist, & Williams, 2015), and these learners, MOOCers (Failde, 2016; Pomerol, Epelboin, & Thoury, 2015), have explored the endless open educational resources (OERs) with massive online learning partners worldwide (Kizilcec, Piech, & Schneider, 2013). MOOCs have become a popular and important issue in educational research as well as in educational practice.

There are many MOOCs related researches, such as the trend of MOOCs (Griesbaum, 2014), the newspaper discourses on MOOCs (Selwyn, Bulfin, & Pangrazio, 2015), the styles of MOOCs (Osvaldo, 2013), the pedagogy issues (Kop, Fournier, & Mak, 2011), theoretical perspective from Psychology (Terras & Ramsay, 2015), Connectivism as a new learning theory (Tschofen & Mackness, 2012), MOOCs for professional development (Radford, Coningham, & Horn, 2015), the learning retention (de Freitas, Morgan, & Gibson, 2015), MOOCs theoretical frameworks (Aparicio, Bacao, & Oliveira, 2016), and the comparison among different teaching styles in MOOCs (McCutcheon, Lohan, Traynor, & Martin,

2015).

A few researches have focused on MOOCs learners, such as the engagement of MOOCs learners (Hew, 2016; Kizilcec et al., 2013), the five types of MOOC completers (Barak, Watted, & Haick, 2016), how the contexts of MOOCers influence their learning (Hood, Littlejohn, & Milligan, 2015), learning styles (Chang, Hung, & Lin, 2015), or a self-report of MOOCer's perspectives (Kvissberg, 2013). To date, however, little of this research has focused directly on the characteristics of MOOC learning. Thus, Koutropoulos et al. (2012) have suggested that further study of the MOOCs learners' behaviors is necessary: to see who is merely a window shopping learner, who is a lurker, who is an active participant, and when and why learners drop out completely. Such research would be highly valuable to better understand MOOC learning and its possible applications for education.

In this paper, I plan to pursue three main goals for research along these lines: to clarify the characteristics of MOOCs learning, to deliberate upon and critique these characteristics, and to infer what the possible implications of these characteristics are for schooling.

In the process of accomplishing these goals, I performed a literature review of journal articles, books, and online materials examining the trend of MOOCs, the nature of the population of MOOCs learners, and the meaning of the characteristics of MOOCs learning. A concise research conceptual framework of the characteristics of MOOCs learning can be seen in figure 1.

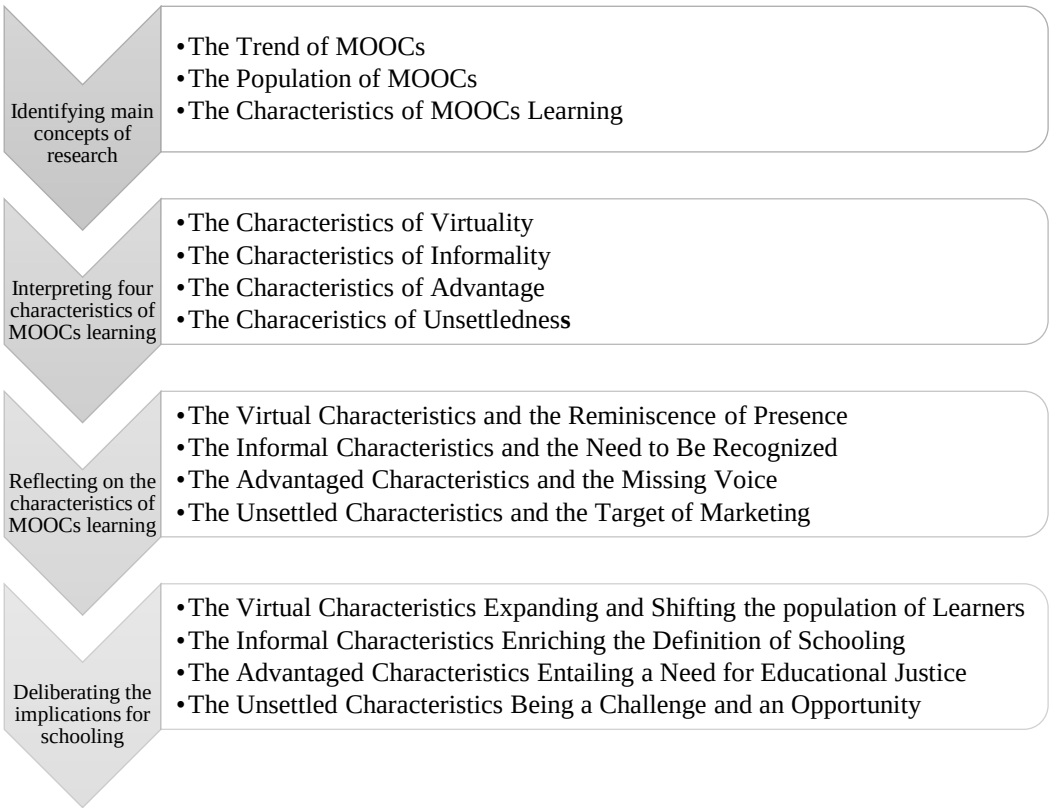

Figure 1. Research conceptual framework of the characteristics of MOOCs learning.

The Trend, Population, and Characteristics of MOOCs

The Trend of MOOCs

Applying technology into education has a long history, such as distance learning, e-learning, or online learning. Distance learning has been occurring for two centuries, from written correspondence, to radio and television broadcasting, to the Internet. E-learning originated during the 1980's and focused on applying technology to facilitate education, by such means as computers, broadcasting, and interactive television, to name but a few of the more prominent means. Online learning can be conducted entirely online or be facilitated partially by online learning, in conjunction with traditional bricks and mortar classroom settings. At this

stage, online learning, web-based learning, and e-learning can be used almost interchangeable to describe these types of learning environments. (More, Dickson-Deane, Galyen, 2011)

E-learning or online learning has increased in practice and research during the past decade (Aparicio et al, 2016), has also affected the practice of education (Downes, 2004), and has revealed a very telling distinction between formal and informal education. For example, due to the increasing pressure and difficulty of accessing higher education, universities have increased their online courses or programs (Meyer, 2014). Although MOOCs only have a relatively short history of development (Baturay, 2015), they have sparked a major new trend in higher education (Lin et al., 2015) and continued to attract the attention of the general public (Jansen & Schuwer, 2015). Nath and Agarwal (2014) described this hyper phenomenon as "Massive Open Online Courses (MOOCs) have recently received a great deal of attention from the media, professionals from educational institute, technology and corporate people" (p. 9).

Compared to open educational resources (OERs) such as Khan Academy, which is designed around the learner-content interaction, MOOCs are designed not only around the learner-content interaction but also around the social interactions among the learners as well (Camilleri, Busuttil, & Montebello, 2014). Moreover, MOOCs enroll massive number of learners and are typically free for global participants (Touati, 2016) with more than a thousand courses from top tier universities (Shah, 2016).

MOOCs provide learners with various functions. These include lifelong learning (Hollands & Tirthali, 2014), enjoy the aged life (Shaevitz, 2016), learning for leisure (Liyanagunawardena et al., 2015), or learning for certifications and degrees (Crawford, 2013; Fischer, 2014) such as the iMBA and Master of Computer Science in Data Science from University of Illinois through Coursera. Clearly, MOOCs have become a major new educational trend in the world (Camilleri et al., 2014). Moreover, MOOCs have the potential to be a major innovation in education (Jacoby, 2014) that could perhaps create a new market, or at least and eventually disrupts the existing market (Bower & Christensen, 1995). A new kind of education, as Christensen and Eyring (2011) suggested, should raise quality, lower cost, and serve more students, and MOOCs have shown their potential to do all of the above and become a means for democratizing education (Dillahunt, Wang, & Teasley, 2014).

The Learning Population of MOOCs

Learners in MOOCs come from diverse populations (Littlejohn, Hood, Milligan, & Mustain, 2016), from primary school students to post-graduates (Goldberg et al., 2015), and over 196 counties around the world (Guo & Reinecke, 2014), typically with minimal to no entry qualifications (Jansen & Schuwer, 2015). The population in MOOCs increased dramatically from the first MOOCs platform, Udacity, in 2012 until now. For example, there are 17,171,208 learners in Coursera, more than 5,000,000 learners in edX, and more than 2,500,000 learners in FutureLearn (Data retrieved from their websites respectively on 20 January 2016). The learners in these three MOOCs platforms are approximately 24,671,208 people, larger than the population of Taiwan. However, only a small proportion of these learners have receive certifications (Chuang & Ho, 2016).

Even compared to other relatively recent online learners, MOOCers are still a relatively new group. Aslanian and Clinefelter (2013) surveyed 1,500 online learners and found that only 14% of them have enrolled in MOOCs and only 5% of them completed one or more courses. However, the population of MOOCers continue to increase and attract, learners not only in higher education but also at other levels, inside of or outside of school (Brahimi & Sarirete, 2015). For example, the majority of MOOCs learners are adults outside of formal schooling (Touati, 2016), 77% of MOOCers were between 20 to 40 years of age, and more than 70% learners had attained at least a Bachelor degree (Guo & Reinecke, 2014). Moreover, the majority of participants came from English speaking counties such as America, India, and the United Kingdom.

Kizilcec et al. (2013) employed a methodology for characterizing learner engagement with MOOCs by looking at 94,091 learners in three MOOC courses creating four typologies: (a) Completers (13.33%): learners who completed the majority of the assessments offered in the class. (b) Auditors (7%): learners who did assessments infrequently if at all and engaged instead by watching video lectures. (c) Disengaged (15.33%): learners who did assessments at the beginning of the course but then demonstrated a marked decrease in engagement. And finally, (d) Samplers (64.33%): learners who watched video lectures but only for one or two assessment periods.

This huge and diverse groups of MOOCs learners are clearly distinct from traditional brick and mortar campus learners, and these distinguishing characteristics

require further clarification.

The Definition of Characteristics of MOOCs Learning

This new type of learning is a major, new cultural phenomenon underlying a large number of people's experiences (Thomas & Brown, 2011), and MOOCs are clearly a cross-culture phenomena (Sadykova, 2014). To further explore the characteristics of MOOCs learning, the paper will proceed to identify the meaning of culture first since learning characteristics denote the preliminary phenomenon of learning culture. It will be easier to understand learning characteristics through cultural perspectives. However, culture has complex meaning and various definitions. Tylor (1871/1920) defined culture as "a complex whole which includes knowledge, belief, art, morals, law, custom, and any other capabilities and habits acquired by man as a member of society" (p. 1). The United Nations Educational, Scientific and Cultural Organization (2002) described, "Reaffirming that culture should be regarded as the set of distinctive spiritual, material, intellectual and emotional features of society or a social group, and that it encompasses, in addition to art and literature, lifestyles, ways of living together, value systems, traditions and beliefs" (p. 4). Both definitions include the dimensions of belief, customs, behaviors, materials, and interaction; and these dimensions are similar to the dimensions of the simplified definition in Oxford online dictionary: "The attitudes and behavior characteristic of a particular social group" (Culture, n.d., p. definition 2.1). Added by Geertz's (1973) concept of continually undergoing changed culture, this paper holds to the dynamic cultural view when the researcher applies the concept of culture (attitudes, behaviors, materials, and interaction) to the characteristics of MOOCs learning. Therefore, this paper defines characteristics of MOOCs learning as MOOCers' learning attitudes, behaviors, tendencies, related materials used, and their interactions in a dynamic learning process.

The Characteristics of MOOCs Learning

The interactions and conversations in MOOCs among learners with unique life experiences and coming from diverse social-cultural contexts around the world raise the attention of researchers (Gillani & Eynon, 2014). When learners of various backgrounds and diverse cultures are brought together in a MOOC, a legitimate and interesting question we could ask is: what kind of relationships have MOOCs created and developed among these diverse learners? (Camilleri et al., 2014) However, students' activities in MOOCs are not predetermined by the types of learners they are, and their stories are not told by automated data-gathering systems

because the learners in MOOCs are alive (Willis, 2013). Thus, the dynamic and diverse characteristics regarding the attitudes, behaviors, tendencies, related materials, and interactions of MOOCs learning be seen as the main approach in understanding the characteristics of MOOCs learning. Following this approach and reviewing related literatures, the author has identified four primary characteristics of MOOCs learning: the characteristic of virtuality, the characteristic of informality, the characteristic of advantage, and the characteristic of unsettledness.

The Characteristics of Virtuality

The educational environment has switched the campus classroom into the online classroom (Bucovetchi, Stanciu, & Simion, 2016) by the process of virtuality (Allison, Miller, Oliver, Michaelson, & Tiropanis, 2012), and e-learning possesses the innate and oft-noted ability to form online communities (Weller, 2007). Online learning extends traditional campus-based learning place into the web-based learning spaces, and MOOCs with their cloud-based nature have the chance to do a riskless educational experiment (Marshall, 2013). Glassman and Burbidge (2014) described that the place stands for a historically and socioculturally derived centripetal force on human thinking. Applying this idea into the context of traditional education, the space of place as the classroom is bounded customs and historically determined practices no matter the school classroom in Taiwan or in United States, whereas the space on an open and free Internet allows people to share meaning and experiences that are formally restricted in a specific place and time.

The traditional classroom acts as a centripetal force converging people into a limited place—classroom, while MOOCs act as a centrifugal force spreading people out into the unlimited space—virtual classroom in which learners can share their knowledge and beliefs through social networks within the global learning community (Camilleri et al., 2014) that is a learning web concept similar to the idea of Illich (1970). MOOCs are leading people into a brave new world, wired, virtual, and information rich (Spring, 2016).

This centrifugal force leads MOOCers away from local spaces and into virtual spaces without spatial-temporal limitations. “We are immersed in an increasingly digital, networked world, and this has implications for reshaping schooling, how we define ‘a place called school’, and, in particular, where and when learning takes place” (Finger & Lee, 2014, p. 82). This change also accords with student’s interests because contemporary students have growing expectation for using online social

connections and educational resources that rely on digital interaction (McNamara, 2015). For example, online lectures or video-based learning have increased markedly from 2000 to 2012 (Giannakos, 2013), and participants are eager to learn specific topics online (Hew & Cheung, 2014). Unfortunately, rich interactions between individual learners and the instructors on MOOCs are all too rare (Godwin-Jones, 2014).This can give MOOCs learners a feeling of isolation (Camilleri et al., 2014) even though the instructor-learner interaction can still facilitate the learners' engagement (Hew, 2016). This sense of isolation may be an important factor in why MOOCs seem to have failed to fully live up to the hype and promise they were initially greeted with, a line of research well worth pursuing, but one beyond the scope of this paper.

MOOCs have built a kind of knowledge system without connection to the geographical places in which people live (Glassman & Burbidge, 2014), and the flows of information on the Internet permit the sharing of meaning and experiences that are formerly learned in restricted places such as campus classroom. MOOCs with the virtual and networking nature integrate connections among learners, instructors, experts, course content, and other various resources together online where MOOCs provide the knowledge that is ahistorical and lacks connection to the vital face-to-face experience of the learner. However, this knowledge has been affecting learner's knowledge systems and ways of knowing outside of classrooms and campuses (Glassman & Burbidge, 2014).

This virtual space, based on the nature of Internet, provides MOOCers with an intellectual habitat where participants contribute their collective intelligence via online social networks. However, there still remains a need to extend this virtual social space beyond purely academic courses (Kizilcec & Schneider, 2015). For example, when MOOCers meet a problem, they could form a small community or network to be able to find solutions to these problems (Camilleri et al., 2014).

The Characteristics of Informality

MOOCs function most obviously as non-formal learning activities (Gillani & Eynon, 2014). "Learners in MOOCs who do not adhere to traditional expectations, centered around regular assessment and culminating in a certificate of completion, count towards the high attrition rates that receive outsized media attention" (Kizilcec et al., 2013, p.178). For example, among the main reasons that MOOCers enroll in certain topics is that they are curious about MOOCs, eager to engage in the personal challenge of simple finishing top tier university courses (such as those of MIT,

Harvard, or Stanford) or those who regarding learning in MOOCs as a kind of intellectually stimulating pastime (Hew & Cheung, 2014). It should be noted that students with high self-regulation and intrinsic motivation typically tie their learning with career aspirations as well (Levin, 2016), often link knowledge gained to the gratification of accessing like-minded peers (Osvaldo, 2013), and regard MOOCs as a non-formal learning opportunity (Littlejohn et al., 2016).

Moreover, most MOOCers are employed full-time (Kizilcec et al., 2013), whereas most campus learners are fulltime students. In addition, the drop-rate is over 95% in MOOCs (Yousef, Chatti, Wosnitza, & Schroeder, 2015), but it is the opposite percentage of drop-rate in traditional brick and mortar colleges and universities. However, these non-traditional learners often have many experiences or areas of knowledge atypical to those of traditional students and can share these experiences and this knowledge online (Cormier & Siemens, 2010).

MOOCs provide a non-formal learning space in which learners choose how, when, and in what ways they choose to engage these platforms (Gomez, Leon, Cubides, Rodriguez, Mahecha, & Rubiano, 2014; Hood et al., 2015; McNamara, 2015; Osvaldo, 2013). Compared to the traditional campus course, in which students are expected to follow teachers' teaching plans carefully, MOOCers tend to learn in a more non-linear fashion (Guo & Reinecke, 2014). Learners can learn with those of diverse abilities, interact with those from across diverse socio-economic levels (Goria & Lagares, 2015), jump back and forth from contemporary assessments back to earlier coursework (Guo & Reinecke, 2014), repeat contents, finish courses intensively, prolong the learning slowly, pay after completing course requirements, and generally enjoy the coursework in a personal way as they see fit. Thus, MOOCs learners are allowed highly flexible approaches to pursue individualized learning styles (Tobolowsky & Allen, 2016).

Besides often navigating course content in this non-linear learning, MOOCers typically prefer short videos, and that is the reason that content providers are often recommended to keep their videos for to less than six minutes (Korkut, Dornberger, Diwanji, Simon, & Märki, 2015). However, typically brick and mortar classroom lecture tend to be around 50 minutes. Some other informal learners' behaviors include high-performing students occupying a sizeable proportion of discussion participants although the majority of forum participants receive failing marks (Gillani & Eynon, 2014), and even high-performing students often don't seem to even intend to complete the MOOC courses.

Gamification has been introduced into MOOCs recently (Korkut et al., 2015) in an attempt to increase the retention rate of learners (Liyanagunawardena et al., 2015), while campus-based classes do not tend to adopt this approach often at all. Furthermore, some MOOCers regarded learning in the MOOCs as a kind of a pastime (Young, 2013), while traditional university students expect to concentrate on learning to get credits for formal degrees.

The Characteristics of Advantage

MOOCs have a heterogeneity of student population with various backgrounds (Kizilcec et al., 2013) that no physical classroom on earth can match (Chuang & Ho, 2016). However, the majority of MOOCers are advantaged groups.

Kizilcec et al. (2013) have found that MOOCs have a high potential for providing global access to education, but there are many exceptions. For example, the majority of MOOCs learners are well-educated professionals from countries with a high Human Development Index (HDI). There are 65% of MOOCers in the first MOOC of edX with bachelor's degree or higher (Breslow et al., 2013), 32% of MOOCers are teachers (Chuang & Ho, 2016), and most MOOCers come from the developed countries. In the case of Kizilcec et al. (2013), the majority of active learners are employed full-time in their three MOOC courses, and 79% of participants come from high or above HDI countries; while only 2.33% of participants come from low HDI countries. Moreover, most participants in forum of MOOCs are well-educated learners from higher developed countries such as those Europe or North America (Gillani & Eynon, 2014).

In addition, the majority of MOOCs are taught in English (Godwin-Jones, 2014), and most MOOCers are English speakers. For example, the 67% of registrants are English speakers in edX (Breslow et al., 2013). This is even in spite of the fact that there many free English learning courses in MOOCs too. The British Council's English learning MOOC through FutureLearn and the University of Oregon's MOOCs on teaching English in Coursera addressed the worldwide interest in learning English (Godwin-Jones, 2014). Still, the overwhelming participation in MOOCs by English speakers remains an incontrovertible fact.

Learners with professional backgrounds have a higher self-regulation about their learning abilities and practice than learners without professional backgrounds (Hood et al., 2015). Some MOOCers even play researcher roles and do research to report on their learning experiences and insights into MOOCs (Bali, 2014; Camilleri et al., 2014). In fact, many MOOCers act as critics to criticize the founders, course designers, and instructors of MOOCs (Wallis, 2013). For example, Wallis (2013)

raised the idea that finishing a course is not the necessarily an assessment of a student's outcome, but having learned something is. These privileged attitudes, behaviors, and specific interactions represent the advantaged characteristics of MOOCs learning.

The Characteristics of Unsettledness

MOOCs learners have nomadic characteristics similar to Sims' (2008) idea on nomads who are not dependent on conventional teachers or educational systems because the knowledge and skills that they seek can be accessed on the Internet at virtually anytime or anywhere without needing the permission or credentialing functions of teachers or traditional educational systems. This phenomenon echoes the Connectivism's proposal ─ learning through participants' linking networks instead of through pre-established learning content (Siemens, 2006), and CCK08 is a good example (Wang, Anderson, Chen, & Barbera, 2017).

MOOCers' unsettled characteristics are further affected by the frequently changing of teaching and learning styles among MOOCs. For example, the first MOOC *Connectivism and Connective Knowledge*, a cMOOC, attracted about 2,200 learners in 2008 (Fini, 2009), and then the popular style of MOOC shifted from cMOOC to xMOOC, with such programs as *Introduction to Artificial Intelligence*, an xMOOC that attracted about 160,000 participants worldwide in 2011 (Davidson, 2013). In cMOOC, learners create learning materials together and learn through sharing and linking each other's knowledge and experience, whereas, in xMOOC, participants learn from formatted online courses with optional online discussion forums. MOOCs update their teaching and learning styles swiftly via the latest learning information. For example, MOOCs learning styles have changed from the first generation MOOCs, which lacked learners' interactions, towards MOOCs 2.0 that provide more mechanisms for user interactions (Salathe, 2014).

The huge proportion of MOOCers with unsettled characteristic is also inherited from the very uncertainness of MOOCs since their future is still under considerable debate (Selwyn et al., 2015). On the one hand, MOOCs are struggling to incorporate degree programs into their courses, but to date few official degrees have been offered for MOOCers to anchor their goals; on the other hand, MOOCs by and large have minimal requirements for learners to enter and exit course, and MOOCers can change their learning attitudes and plans at any time. Moreover, the emerging technologies that initially inspired MOOCs' innovations continually lead learners to

attempting to experiment with new learning approaches. For example, with the increasing usage of smartphones, mobile learners in MOOCs increased by 80% from 2014 to 2015 (Coursera, 2016). The constantly changing feature of MOOCs disturbs the anchoring of participants' learning characteristics.

The unsettled nature of this phenomena and their participants can also be seen in the fact that the MOOCers formed crowds but not genuine communities in forum participation (Gillani & Eynon, 2014). For example, participants in the first half of the MOOC phenomena were mostly dominated by those who only participated in the first two weeks of the MOOC, whereas in the second half of the MOOC, the forums were dominated by those who had participated in more than three weeks of the MOOC (Koutropoulos et al., 2012). The participation of MOOCers shifted quickly during the learning process and never became fixed in a stable involvement. Because of instability learning process in the MOOCers have become acculturated to be free learners with their own unique set of unsettled characteristics.

These unsettled characteristics seem waiting to be tamed, but in which direction will be another question and challenge. However, it is beyond question that the autonomy of the individual learner plays a highly important role for MOOCers to determine how they will participate in MOOCs (Zhou, 2015).

Discussion and Reflection

> *When people think about learning, they usually think about schools. And when people think about schools, they usually think about teachers. In this book, we take a different approach…call this phenomenon the new culture of learning…. (Thomas & Brown, 2011, p.17).*

The Virtual Characteristics and the Reminiscence of Presence

The virtual nature of MOOCs (Kizilcec et al., 2013) provides a wide foundation for MOOCers to broaden the possibilities of their learning (Popovic et al., 2016). These virtual characteristics echo those of the information society, the ability to expand flexibly with only minimal limitations of space, time, or participant. These virtual characteristics available to MOOCers will expand correspondingly as society is ever increasingly digitalized.

However, the very virtual characteristics of MOOCs learning make it extremely difficult to support the face-to-face interaction and presence that MOOCs participants expect and cherish (Camilleri et al., 2014). Moreover, this feeling of

physical presence felt by learners in campus-based courses is positively related to their objective, positive academic performance (Louis, Bastian, McKimmie, & Lee, 2016), and MOOCs may mask the spatial-temporal conditions where humanism framework locates (Know, 2016). It is a significant dilemma for educators to proclaim the MOOCs and to satisfy learners' needs of presence.

On the one hand, the intellectual growth of MOOCers will little by little increase under the facilitation of virtual characteristics mentioned above. On the other hand, many MOOCers will continue to be eager for that feeling of physical presence and continue to harbor expectations of face-to-face interactions among the members of the courses. This tension seems unlikely to be resolved any time soon and will haunt MOOCers, even as this major new educational trend continues to flourish. Thus, the needs of support from either instructors or peers to achieve this sense of presence will continued to remain crucial to the success and ongoing development of MOOCs (Hew & Cheung, 2014). Nevertheless, this mission will not be easy, especially considering how large the huge population of MOOCers is and how much and how quickly it continues to grow. This entails the need for corresponding strategies and innovative, supportive means of facilitating sustainable, successful, and gratifying learning among MOOCers. Many analysts have noted the importance of continuing to explore the relation between their need for a sense of physical presence and academic performance in the digital era (Louis et al., 2016).

The Informal Characteristics and the Need to Be Recognized

Facilitated by information technology, the boundaries of education are becoming increasingly blurred (Brown, 2013) because students can now gain knowledge and skills from schools but also from the spatially and temporally unlimited learning now easily available online. As our definition of school learning becomes increasingly unbounded, the methods of defining, delivering, and certifying it must continue to evolve as well (Brown, 2013). While the often informal characteristics of MOOCs learning can often make this a challenge, it also opens a wide gate for the creation of learning societies, such as those envisioned by Illich (1970), who preferred a deschooled society where people could form learning webs to a society of formal education that are defined by certifications and degrees. For Illich, an ideal educational system would serve three purposes:

> *It should provide all who want to learn with access to available resources at any time in their lives; empower all who want to share what they know to find those who want to learn it from them; and, finally, furnish all who want to present an issue to the public with the opportunity to make their challenge known. (Illich, 1970, p. 75)*

The various and diverse learning styles of MOOCers will continue to redefine the nature and definitions of learning, schooling, and education. The completion of certifications and credentials will likely be only one among many of their options, not a coerced goal. In addition, facilitating ways for enhancing learners' engagement will also continue to become ever more varied. For example, to improve students' motivation to learn and participate actively (Hew, 2016), MOOCs could perhaps be based on something akin to games to improve enrolment and enhance retention (Liyanagunawardena et al., 2015).

Clearly the expectations of MOOCers are far more diverse than those of traditional campus-based students. MOOCers have broader intentions, varied interests, and diverse learning styles. These features will continue to redefine the aims, curriculum design, and pedagogy of schooling. How to redefine and broaden the definition of the learning space for MOOCers may best find inspiration from the ideal of Illich's deschooling society characterized by its ideal of learning webs that help foster a better educated and more humane society.

The Advantaged Characteristics and the Missing Voice

Often times, MOOCs provide high quality courses for those who are already well educated learners to extend their learning and to help many professionals advance their professional knowledge and abilities. While MOOCs by and large tend to be open to anyone and proclaim the laudable ideal of democratizing education, as a practical reality, it tends to be those already advantaged individuals who take the major benefits from MOOCs. Those who live in places with low a HDI, who have not been well educated, and who do not speak in English well unfortunately tend to be the neglected minority when it comes to utilizing MOOCs (Marshall, 2013) and tend to gain the least benefits (Macleod, Haywood, Woodgate, & Alkhatnai, 2015).

Although the pioneers hoped that MOOCs would serve to greatly democratize education (Rhoads, Berdan, & Toven-Lindsey, 2013), the empirical results to date do not bear this ideal out since these online courses are typically utilized by those who are already academically strong and highly self-motivated learners (Tobolowsky &

Allen, 2016). Furthermore, learners in developing countries are typically not prominent participants (Macleod et al., 2015). Moreover, these disadvantaged people not only tend to lack these abilities and attitudes but also get few supporting measures from education.

In this literature review, the researcher hasn't found relevant articles to explain and solve the problems of disadvantaged MOOCs learners. Therefore, how MOOCs can do better to support all learners with diverse backgrounds (Hood et al., 2015) especially the people in the disadvantaged situations becomes a significant issue for further exploring if we want to close the digital gap (Hansen & Reich, 2015).

The Unsettled Characteristics and the Target of Marketing

MOOCs are the free arena for MOOCers to explore the online courses freely. The unsettled MOOCers could learn unrestrainedly from the educational treasures online with their own ways as they see fit, and the MOOCs platform become a huge residence for MOOCers to develop their potentials willingly. These nomadic MOOCers do not depend on traditional instructors and formal schooling because the online courses and OERs can be accessed at anytime and anywhere. MOOCs become the self-study courses (Campbell, Gibbs, Najafi, & Severinski, 2014) and encourage MOOCers to be autodidacts and active learners to form their online learning communities (Hew, 2016).

Although MOOCers may sometimes seem to be something of a monolithic crowd, they still nevertheless possess the possibility to challenge and interact with the authority figure of the instructor because MOOCers are till notably very keen to have interactions with their instructors (Camilleri et al., 2014). Nevertheless, it will also become the possible worried outlook that the MOOCers' characteristics could be directed by providers of profit-based MOOCs toward the marketized characteristics or consumption-based cultures for learners as consumers (Porter, 2015). Especially, in the fourth industrial revolution, such as artificial intelligence or robotics, changes the patterns of consumption, production and employment (World Economic Forum, 2016), and the new characteristics of MOOCers may also bring the pressure on the change of educational consumption. The decreasing free certification in MOOCs is an example (Chuang & Ho, 2016). When the academic MOOCs are transforming to corporate MOOCs (Dodson, Kitburi, & Berge, 2015), how to settle MOOCers' characteristics down in the right direction will become a crucial issue.

Implications for Schooling

As the digital revolution continues to progress, education will inevitably face an ongoing set of new opportunities and challenges (Ospina-Delgado & Zorio-Grima, 2016). The conventional expectation is that these ongoing innovations in technology will bring people a better future (Anderson, 2013). In deliberating upon the contemporary educational conditions, the paper has inferred four implications that may contribute to better schooling in the future.

The Virtual Characteristics Expanding and Shifting the Population of Learners

The expansion of virtual learning is creating new educational arenas, and these arenas will not only open up new learning opportunities likely to increase the learning population but also present a challenge to traditional schooling by shifting learning from brick-and-mortar campuses to virtual classrooms through mobile learning (Popovic et al., 2016).

The virtual characteristic will expand the population of learners because those who have graduated from school, live in remote places, lack substantial resources, haven't the time, or are prevented for other reasons from taking a seat in a traditional classroom can rejoin the community of learners again via MOOCs. Furthermore, many younger students are digital natives, who love to surf online and utilize social media—and tend to be very good at it (Hlinak, 2016).

The virtual characteristic will shift the population of learners from campus to virtual classroom dramatically when the quality of MOOCs is acceptable for awarding the certification, diploma, or degree. MOOCs are top-tier-universities for free and for all with flexible learning choices and without spatial-temporal limitation. MOOCs may own the potential for disruptive innovation in education (Jacoby, 2014) when their quality is as well as the quality of traditional classroom teaching. MOOCers who are the informal learning groups today may become the mainstream students of formal schooling tomorrow.

Before that, educators and learners could still take the advantages from MOOCs because they are free available everywhere around the world, but many educators fail to understand the changing society by technology (Siemens, 2006). Educational policy makers and the school leaders should aware the possible shift of learners from traditional campus to virtual online learning space, especially MOOCs' characteristics echoing the increasing virtual infrastructure and virtual interaction

living style in the 21st century.

To improve the quality of MOOCs, satisfy the various needs of possible increasing populations of MOOCers, and create spaces that may inspire the engagement of MOOCers (Bali, 2014), educational policy makers should plan supportive measures in advance and increase the resources currently dedicated to MOOCs, to respond to possible changes in which virtual learning societies may soon comprise a substantial proportion of the educational system as a whole.

The Informal Characteristics Enriching the Definition of Schooling

Traditionally, when we talk about education, we mean schooling, which focuses on classroom teaching, consistency goals, linear learning sequences, and completion rates. However, we need to expand our visions of schooling to respond to the new style of informal learning culture presented by MOOCs where learning could be engaged in everywhere, conducted at any time, driven by goals chosen by learners, non-linear learning sequences, and a greater emphasis on lifelong learning.

Moreover, MOOCs are continually improving their quality through the use of big data analysis learning behaviors, analysis of consequences of millions of MOOCers every mouse click, video player control use, online quizzes selection, text entries in discussion forums, assignments, peer grading, assessments, learner feedback, and other platform records (Hsieh & Chen, 2015; O'Reilly & Veeramachaneni, 2014). When the quality of MOOCs finally gets accepted by the formal educational system, the line between MOOCers and campus learners will become blurred. The informal characteristics of MOOCs learning and the formal characteristics of schooling will converge.

Thomas and Brown (2011) positively regarded this type of learning is a cultural phenomenon that underlined a large number of people's learning experiences and can augment learning in every facet of traditional education. On the one hand, schooling should extend to the informal field, such as MOOCs, otherwise limited in the brick-and-mortar classroom teaching; on the other hand, online learning should act an active role in the future schooling. Thus, we should reasonably expect that MOOCers' non-typical learning characteristics could cooperate with traditional learning. In addition, we should also reasonably expect that this collaboration will also characteristics to provide a better supporting culture for the information society itself. This cooperation has great potential to foster a win-win situation for both

types of education, as well as to uniquely enrich the ever-evolving definition of schooling.

The Advantaged Characteristics Entailing a Need for Educational Justice

Although MOOCs are free and for all, the disadvantaged are still a minority of the participants and receive few of their potential benefits. The cultural reproduction characteristic of traditional education (Bourdieu & Passeron, 1990) could possible reappear naturally in the learning process of MOOCers, and it will block the ideal of democratic education via MOOCs. To avoid this, educational policy makers should consider using John Rawls' (1999) second principle of justice, the Difference Principle, "Social and economic inequalities are to be arranged so that they are…to the greatest benefit to the least advantaged…" (p. 266), to facilitate the opportunities available to disadvantaged people by providing them with more privileged measures that are similar to the policy of educational priority area project.

We should apply Rawls' Difference Principle to the least well off, the socio-economically disadvantaged MOOCers, because Zhou (2015) has found that such MOOCers need additional facilitation and guidance, especially because disadvantaged tend to lack the self-regulation in learning characteristic of learners with advanced credentials and more extensive professional backgrounds (Hood et al., 2015).

The precise nature of these supportive measures will be dictated by the individual needs of these various disadvantaged learners. For example, if the prospective disadvantaged MOOCers lack online learning facilities, policy makers, governments, schools, colleges, universities, and nonprofit organizations should establish points at which free Internet access is widely available to the general public, such as at libraries, community centers, educational institutions, and social service agencies. If lack basic Internet literacy or are unaware of how to utilize MOOCs, then these same entities mentioned above should provide them with the training necessary to ameliorate these deficiencies, at the same time provide them these physical facilities mentioned above, or perhaps online. If these prospective disadvantaged MOOCers are hindered by a lack of facility in their native languages, then we should encourage the provision of remedial language skill training by governments, schools, colleges, universities, and nonprofit organizations, to be provided at libraries, community centers, educational institutions, and social service agencies, or perhaps even online.

The Unsettled Characteristics Being a Challenge and an Opportunity

The unsettled characteristics of MOOCs learning, due to it being in its infancy (therefore before unfamiliar to many of those among the general public, being ambiguous in its nature and possible approaches) give it the potential to move in either in negative or positive direction. On the one hand, if MOOCs become coopted by largely market-driven priorities and a consumption-based global neoliberal economic culture, where the quarterly profits of transnational corporations is a priority over people and the biosphere, then we will be moving in a negative direction: toward schooling. If, on the other hand, MOOCs can be nurtured in favor of the deschooled society something more akin to that envisioned by Illich (1970) to avoid unified schooling (Brown, 2015), then we will be moving in a positive direction: toward education.

As a practical reality, it is probably unlikely that the more idealized latter result will occur. So, pragmatically speaking, the more realistic challenge will be how to keep the balance between marketized MOOCs oriented towards schooling and more liberatory MOOCs oriented towards education. For example, as an illustration of this "balanced" approach, if MOOCs could retain their free-access policy in conjunction with a pay-for-certification option, then MOOCs could generate a reasonable revenue stream by which to sustain themselves, while also continuing to provide a valuable public good to vast swaths of the population at no cost to them.

The prospective ways in which to create this kind of "win-win" strategy remains challenging and elusive. Yet it is also an opportunity that learners, educators, policy makers, foundations absolutely cannot fail to engage with – and soon. It is also well worth continued academic research, in largest part to provide guidance and options to the aforementioned organizations and individuals.

Conclusion

> *By virtue of the unique characteristics indicative in their name – namely their massive scale, their openness and their online setting – MOOCs challenge many of the traditional modes of education. In doing so, they question traditional pathways, purposes and outcomes in education. (Littlejohn et al., 2016, p. 47).*

It would be a truism at this point to say that the world has changed rapidly under the inspiration of the information and communication technology revolution. These innovations have, in turn, created innovations in education, created a new style and delivery method of learning－MOOCs－and cultivated a huge population of new learners－MOOCers－both of which possess unique and highly innovative characteristics that hold enormous promise.

Noting the trend of new learning characteristics and the shift of learning population becomes a crucial foresight for educational policy makers and school leaders because the ignorance of the trend or the possible dramatic change in education will cause huge damage and high remedy cost. For example, the unawareness of the low birthrate in the end of 20st century of Taiwan and establishing naively many new colleges and universities cause the high pressure and various conflictions for merging universities or abolishing colleges.

The shift of learning characteristics represents the change of huge learning population from physical campus to the virtual online learning space. History teaches everything including the future, and the ubiquitous learning is inevitable in education (Ministry of Education, 2016). The policy makers should be prepared to invest and expand cautiously the physical campus infrastructure, face-to-face teaching and learning facilities, and school-based personnel. At a minimum, when the time is ready for formal credential-granting schooling to occur in the virtual online space, it is imperative that policy makers and educational leaders should be ready and have the foresight to invest the educational budget on training the personnel and expanding the facilities regarding to the needs of the huge of learning population online.

Moreover, the need for educational justice and longing for a right direction of new learning culture in MOOCs will encourage and push the researchers, school leaders, and policy makers to proclaim a fair learning arena for the disadvantaged people and to pursue a sustainable learning culture not only for democratizing education free and for all but also for qualified MOOCs in a future online learning society.

The mindfulness on the characteristics of MOOCs learning and the arrangement of the corresponding measures in advance will create and flourish a sound educational field for cultivating MOOCers' positive learning characteristics and expanding their potentials to pursue their personal good as well as the public good.

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磨課師學習之特質及其對學校教育的啟示

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本文探究大規模開放性線上課程（磨課師）之學習特質並推論其對學校教育的啟示。在資訊科技助力下磨課師風潮吸引百萬慕課者。這股全球風潮是一種伴隨磨課師學習特質之文化現象。很多磨課師相關研究已發表，但少有磨課師學習特質的研究。此不足鼓舞本研究來彌補學術上的空隙與探索其對教育的影響。經由分析相關文獻後發現四種磨課師學習特質：虛擬特質、非正式特質、優勢特質、未定性特質。透過批判性檢視後研究提出四項論點：對臨場感的懷念、認肯的需求、消失的聲音、市場的目標。最後研究者提出四項對學校教育的啟示：虛擬特質擴展與轉換學習族群、非正式特質豐富學校教育的定義、優勢特質引出教育正義的需求、未定性特質成為一種挑戰與機會。

關鍵字：大規模開放性線上課程、學習、特質、學校教育、線上教學

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