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MOOCs as a Solution for High School Seniors' College Admission Problems

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Abstract

High school seniors (HSSs) in Taiwan have encountered several college admission related problems such as uncertainty about the characteristics and learning in college departments, the high cost of the admission application process, the spare time between the General Scholastic Ability Test (GSAT) and commencement of university study, and unpreparedness for university study. However, both traditional and newly proposed solutions have shortcomings. To find a better solution, this study draws insight from the trend of MOOCs and investigates the features of MOOCs based on relevant literature to evaluate the feasibilities of MOOCs as a new solution. To verify these feasibilities, I put forward some concerning perspectives and examine them critically. The research finds reasons why MOOCs offer a better solution and infers some practical ways for HSSs to experience college learning via MOOCs: Browsing MOOCs and finding courses of interest, learning from the selected courses, thinking reflectively on one's own learning and adapting learning in high school, as well as creating online learning profiles for personal application and further learning.

Keywords: college admission, high school senior, MOOCs, personal application

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磨課師作為解決高三學生升大學問題的一種方案

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摘　要

臺灣高三學生面臨一些大學入學相關問題，如不明瞭大學科系特性與學習，高額申請入學相關費用，學測後與入大學間學習空檔，以及大學學習先備能力不足的問題。然而，既有與規畫中的解決方案尚有不足之處。為了探索較好的解決方案，研究者從磨課師風潮中獲得啓示並透過相關文獻探討磨課師的特質，進而評估磨課師成為新的解決方案之合宜性。研究透過對新解決方案的合宜性進行批判性反思，從中證成磨課師做為解決方案的合宜性。研究發現數項支持磨課師是解決高三學生問題可行方案的論據，並進而推論出幾點具體做法：瀏覽磨課師相關課程並找出符合興趣的課程，學習選擇的課程，反思學習成效來調整高中學習步調，建立線上學習檔案做為個人申請入學與進一步學習的資料。

關鍵詞：大學入學、高三學生、磨課師、個人申請入學

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I. Introduction

Education has always been highly valued in Taiwan (Department of Statistics, 2015), and higher education has become extremely popular education as the college gross enrollment rate reached 83.79 % in the 2014 school year (Ministry of Education, 2015). There were 159 universities or colleges and 1,339,849 college students in the 2014 school year in Taiwan (Department of Statistics, 2015). The role of higher education has changed from education for the elite to education for all, as Watson and Watson (2013) mentioned, and issues related to college admission have become common experiences for almost all high school seniors (HSSs).

HSSs have encountered college admission related problems, which include uncertainty about the characteristics and learning styles of university departments (Wang, & Wu, 2009), the high cost of the admission application process (Wang, 2014), the spare time between the General Scholastic Ability Test (GSAT) and university study (Wang, 2015), and un-readiness for university studies (Argarwal, 2014; Shyu, Hu, Tsai, Pan, Chen, & Liou, 2006).

I argue that traditional and newly proposed ways to mitigate these problems have some shortcomings. Reading college introduction pamphlets or attending department workshops to explore the characteristics and learning styles of departments are far from the real college learning experience. Moreover, workshops are expensive and not available for all. Building a Senior High School Students' Learning Process Database (K-12 Education Administration, Ministry of Education, 2015) for assessing HSSs online at a low cost instead of going through a face to face interview is not a sufficient assessment process because it must be backed up by various authentic learning activities. Postponing the GSAT testing date and increasing GSAT testing content to make up for learning vacancies and to improve students' readiness for college decreases the time for HSSs to explore their target departments' characteristics. HSSs expect a better solution and better supporting measures.

Along with innovation in information technology and online education, a new solution may emerge. The shift from monolithic learning to dynamic flexible learning

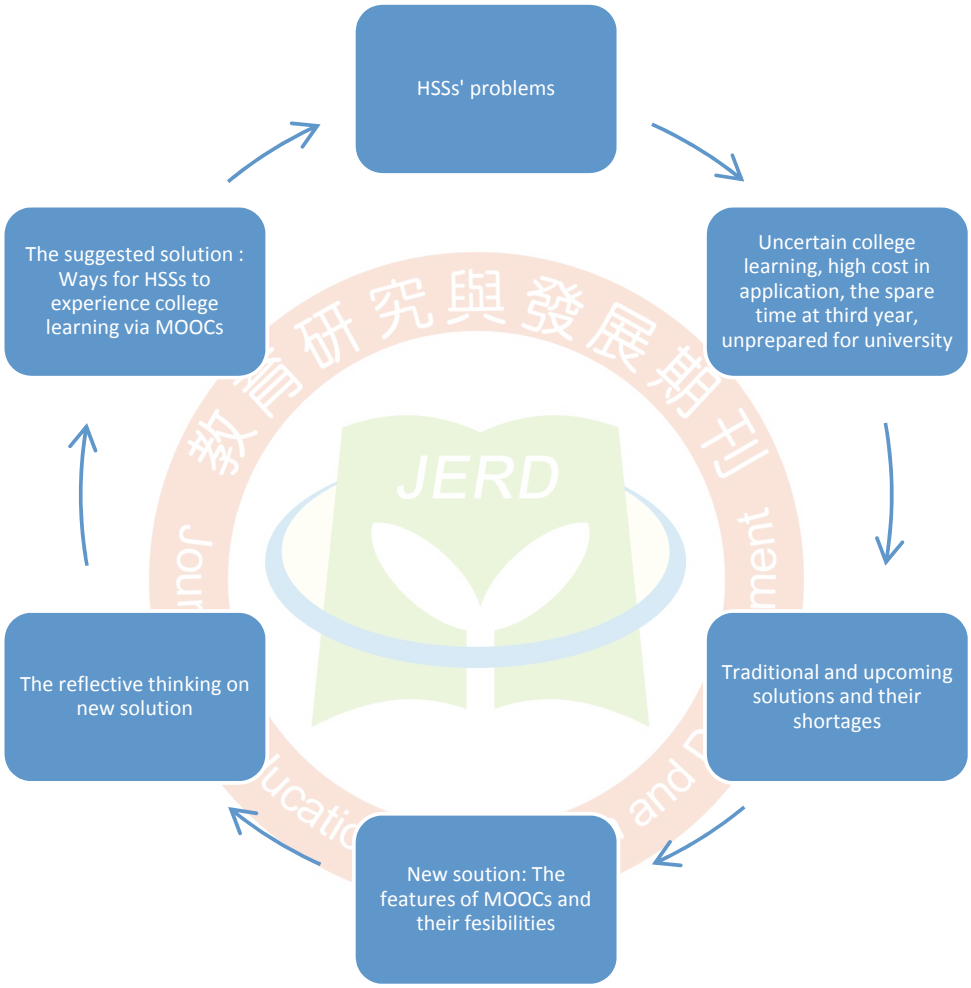
has taken place (Lytras, et al., 2015), and technological evolution is affecting the ways of learning that will allow people around the world to learn online and to build a better future (Anderson, 2013). Resta (2003) has found that educational systems around the world are under increasing pressure to use information and communication technologies to teach students the knowledge and skills they need in the 21st century.

Online education has been expanding rapidly over the last decade (Hollands & Tirthali, 2014), and the newest trend is massive open online courses (MOOCs). MOOCs have received impressive coverage in the press and news (Raffaghelli, Cucchiara, & Persico, 2015) and have become a new way to share universities' learning and teaching resources (De Freitas, Morgan, & Gibson, 2015).

MOOCs have not only captured the interest of academics and students at higher education institutions but also the interest of students and teachers in high schools. MOOCs can also offer a big boost to the K12 curriculum (Brahimi & Sarirete, 2015). For example, the University of Wisconsin Lacrosse created the open online course "College Readiness" to help pre-college students preparing for the challenge of a college-level math course and assess their current readiness to pursue math courses at the post-secondary level. Thus, MOOCs may play suitable role in solving HSSs' problems.

Although e-learning has become an important application for education (Lin, Lin, & Hung, 2015), applying MOOCs in education is still a prominent issue of debate (Selwyn, Bulfin, & Pangrazio, 2015). We need to seriously exam their feasibilities before applying them to HSSs' curriculums. In order to see the entire context of this research, I develop a conceptual literature review framework to delineate the research (See detailed at Figure 1), and the literature review approach is used to outline the status and direction of research in this field and guide future studies (Giannakos, 2013).

Figure 1. The conceptual literature review framework



(Figure is made by the author.)

This study explores the relevant literature to describe four HSSs' problems and argues rationally about the shortcomings of traditional and newly proposed solutions. In order to resolve these shortcomings, this study draws insight from the booming trend of MOOCs. I investigated the relevant literature to clarify the features of MOOCs and compared these features to HSSs' problems. I then identified the matching points and deduced the feasibilities of applying MOOCs as a new potential solution. For verifying

this new solution, I critically examined some worrying viewpoints, evaluated pro and con perspectives, and verified the legitimacy of feasibility of MOOCs for HSSs. To apply the new solution to the real situation, I suggest some ways for HSSs to experience college learning via MOOCs.

The goals of this study include (a) exploring some HHSs' problems, (b) investigating the features of MOOCs and its potential feasibilities as the solution for these problems, (c) thinking reflectively about MOOCs as the solution for these problems, and (d) suggesting ways for HSSs to experience college learning via MOOCs.

II. Some High School Seniors' Problems

This paper addresses four problems related to HSSs' college admission.

A. Uncertainty about the Characteristics and Learning Styles of Departments

Understanding the learning styles and characteristics of departments is a crucial task for HSSs because students need these data to choose a department to fit their interests and potential. These decisions will also relate to students' learning engagement in university and future career development after university. Kung, Chiang, and Huang (2014) have found that HSSs worry about how to make a better learning plan for university studies and how to get a job after college. Unfortunately, there are few chances for HSSs to see real learning activities in university, not to mention actually experience them.

Facing the uncertain conditions of university learning and choosing a department, Wang and Wu (2009) suggested that students should get more information about departments' characteristics, learning requirements, and future development to evaluate whether these features suit their needs. Moreover, Chen, Cheng, and Cheng (2010) found that departments need to recruit students who have enthusiasm in their disciplines because these students will have better learning achievement (Yang, Wang, & Chen, 2014). The better way to understand the real learning activities at a university and to find out students' enthusiasm about various departments would be for them to actually experience the departments' courses, but most students can only browse through school information on the web, read pamphlets, listen to introductory lectures, or talk with

experienced people.

Some departments do invite high school students to experience university learning via summer workshops or winter camps introducing department features. Such examples include the “Literature, History, and Philosophy Experiencing Workshop” at Chinese Culture University, the “Physics Workshop” at National Chung Hsing University, and the “Winter Camp” at the Department of Foreign Language and Literature, National Taiwan University. These workshops accept only limited students, charge each student thousands of dollars, and are still quite different from the regular teaching and learning at university. HSSs need a wide channel for all, affordable programs, and a more authentic approach to see and to experience regular teaching and learning in college. However, no such channels are available to HSSs as of yet.

B. The High Cost of the Admission Application Process

Traditionally, the Joint University Entrance Examination acted as an open and fair educational selection mechanic for all HSSs from 1954 to 2002 in Taiwan (Lin, 2012), but it was replaced by the Multiple Entrance Program, which encourages teachers’ various teaching styles to fit the development of student’s multiple intelligences (Tsai, 2005). The Multiple Entrance Program includes the Star Plan, Personal Application, and Entrance Examination (see details on the program website: http://nsdua.moe.edu.tw/index.php/admissions).

The Star Plan aims to provide more admission opportunities for students from remote or country high schools; the Personal Application provides not only the chance for students to use their learning profiles and interview performance to enter the departments they like but also the chance for departments to setup their own requirements to filter applicants and recruit suitable freshmen; and the Entrance Examination keeps the traditional channel open for students who prefer test-based admission or who are dissatisfied with the results from the Star Plan or Personal Application.

Fan and Huang (2014) found that more and more HSSs prefer Personal Application to other approaches because students get a better chance using this approach than in the Star Plan and can get the results earlier than those taking the Entrance Examination, which takes place in the summer, after students graduate from high school. Moreover,

the students adopting Personal Application and the Star Plan attain better achievements in college than students who take the Entrance Examination (Yang, et al., 2014). The educational policy supports Personal Application with a higher quota. The quota for the Star Plan is 13,357 (College Admissions Committee, n.d.a); the quota for Personal Application is 54,322 (College Admissions Committee, n.d.b); and the quota for the Entrance Examination is 48,496 (Distribution of the University Entrance Examination Committee, 2015, July 17)

Nevertheless, students who choose Personal Application for admission encounter more social-economic challenges than those adopting other types of admission because students need to prepare many materials for documentary evaluation and the face-to-face interview (Fan, & Huang, 2014). This is burdensome for low social-economic students or students in rural areas. Generally, the students entering public university by way of Personal Application have higher social-economic level than do the students entering public university by way of the Entrance Examination (Wang, 2014).

How to reduce the cost of preparing the materials for Personal Application or provide a disadvantaged-friendly approach becomes an important mission for proclaiming educational justice or fairness.

C. The Spare Time between GSAT and University Study

In the 2015 school year, more freshmen were accepted through the Star Program (12,722) and Personal Application (46,777) than through the Entrance Examination (48,537) (College Admissions Committee, 2015). The freshmen accepted through the Star Program and Personal Application need to take the GSAT at the end of the first semester of the third year of high school. The testing scope of GSAT includes the first and second years of high school. Therefore, the contents of the third year of high school are often neglected by those seniors who plan to apply to college by way of the Star Program or Personal Application because these seniors are either too busy preparing various application materials and improving interviewing skills or cannot see the connection between the learning contents in the third year and their future college life. Thus, the learning in the second half of the third year of high school is virtually abandoned (Lee, 2013). This neglect leads to HSSs' learning vacancy in the third year.

Some NGOs worry about this phenomenon and propose fine-tuning the Multiple Entrance Program. These NGOs made a united petition on 20 September 2015 to ask the government to reduce the Personal Application quota to 30%~40% and postpone the General Scholastic Ability Test till May or June in order to ensure HSSs attain comprehensive learning in the last semester (Wang, 2015).

This petition will challenge the majority's preference for the Personal Application and reawaken anxiety about the infamous exam-oriented educational mechanic. These pro and con forces will struggle with each other and ultimately affect policy change, but our HSSs cannot put their precious learning lives on pause to wait results which are still light-years away. We need a stable policy to seal or reduce this learning gap or vacancy as soon as possible.

D. Unpreparedness for University Studies

Lee and Sun (2010) revealed that there is a positive relationship between autonomous motivation of course-taking and learning engagement among college students. They also suggested that college students need guidance about autonomous learning and career planning.

Through the Multiple Entrance Program, students with various backgrounds from high schools, vocational schools, and comprehensive high schools enter universities, but some of them lack sufficient subject knowledge background to study autonomously in a specific discipline. For example, some students lack the biology and chemical knowledge to fit the requirements of the Department of Occupational Safety and Health (Shyu, et al., 2006). Another study showed how science and engineering students lack the mathematics and physics ability for university learning (Chiu, 2014).

A similar situation has arisen in the U.S. where nearly 60 percent of first-year American college students were unprepared for postsecondary studies (Argarwal, 2014). HSSs need the awareness of what subject backgrounds they need for future learning in the departments they have chosen and must be autonomous efficient learners.

On the one hand, universities should set their own proper standards of admission to filter various applicants (Sung, Chou, Wu, Lin, & Tseng, 2010); on the other hand, universities should provide the chance for all seniors the chance to experience college

learning. After all, learning culture shock defies written regulations or explanation. Experiencing learning activities in college is a better way for students to evaluate themselves and find out what they need for college. This proposal echoes to our ancient wisdom: I hear and I forget. I see and I remember. I do and I understand (Confucius Analects, n.d.).

Does there exist a way for all HSSs to freely explore the real or close to real college learning activities? We have not seen this opportunity yet. However, this study draws insight from the new MOOCs trend and proposes that MOOCs could serve as a possible way for HSSs to experience quasi-real or virtual college learning for free and for all.

III. The Features of MOOCs and Potential Feasibility as Solutions

This study paper investigates the features of MOOCs as the foundation for exploring feasibilities in regard to the research problems and the purposed solution.

A. The Features of MOOCs

1. University courses online

MOOCs have become a world phenomenon (Brahimi & Sarirete, 2015), and the *New York Times* dubbed 2012 as "The Year of MOOC" (Wharton-Michael, 2014). In the early stage, Stanford's Professor Sebastian Thrun and Google's Director of Research Peter Norvig opened the "Introduction to Artificial Intelligence" course free for all online in the Fall of 2011, and this course attracted about 160,000 learners from 190 countries worldwide (Davidson, 2013). Based on his successful experience, Thrun created Udacity in early 2012, which became the first MOOCs platform. Another two Stanford professors, Daphne Koller and Andrew Ng, announced their plan to build Coursera in April, 2012 (Waldrop, 2013), and Coursera has become the biggest MOOCs platform so far. MIT's Professor Anant Agarwal cooperated with Harvard University to build edX in May, 2012, and edX has become the first non-profit MOOCs platform. Coursera, edX, and Udacity are the three dominant MOOCs in the world (Zemsky, 2014).

Most MOOCs come from universities. For example, Coursera has 138 partners,

which include Taiwan University, Yale University, Johns Hopkins University, Stanford University, University Zurich, etc. (Data retrieved 2015, December 4 from https://www.coursera.org/). These universities' online courses have become windows for students to see and to experience the learning in universities, in specific disciplines, and in various departments.

2. For free and for all without spatial-temporal limitations

MOOCs are freely available for all via the internet (Terras & Ramsay, 2015). Although only few MOOCs are non-profit oriented such as edX, most MOOCs platforms, including Coursera, Udacity, or FutureLearn, open most of their courses for free. Paying for authorized certification is only an optional choice for learners in most MOOCs platforms, and even the fees for paid MOOCs courses are much cheaper than regular courses in universities. For example for the Edinburgh University's "Introduction to Philosophy" costs 49 USD on Coursera and the University of Leeds' "Fairness and Nature" costs 34 GBP on FutureLearn.

MOOCs present few spatial-temporal limitation compared to traditional school learning because students can learn anywhere via the internet (Terras & Ramsay, 2015) and anytime with a personal computer, tablet, or smart phone (Chang, Hung, & Lin, 2015).

3. Profound courses in Art, Humanities, Science, and Technology disciplines

MOOCs offer thousands of courses in profound subject areas. For examples, Open Education Europa, the gateway to European innovative learning, provides Open Education Scoreboard which compiles the existing European-provided MOOCs available on different open websites into eight Subjects: Applied sciences (254 courses), Arts (62 courses), Business (232 courses), Humanities (252 courses), Mathematics and statistics (155 courses), Natural sciences (173 courses), Science and technology (414 courses), and Social sciences (317 course) (data retrieved 2015, December 15 from http://openeducationeuropa.eu/en/open_education_scoreboard).

Coursera has created 1,504 courses organized into nine catalogs: Arts and Humanities, Business, Computer Science, Data Science, Life Sciences, Math and Logic, Personal Development, Physical Science and Engineering, and Social Sciences (data

retrieved 2015, December 5 from https://www.coursera.org/browse/).

EdX has 770 courses and classifies them into 30 categories such as Architecture (8 courses), Art & Culture (55), Biology & Life Sciences (76), Business & Management (116), Chemistry (27), Communication (32), Computer Science (146), Data Analysis & Statistics (70), Design (4), Economics & Finance (66), Education & Teacher Training (33), etc. (data retrieved 2015, December 5 from https://www.edx.org/). These catalogs and courses provide enough content for students to find courses related to their target departments in college.

4. Various learning options to suit learners' various needs

MOOCs provide various contents and learning options to fit students' various needs (Chang, Hung, & Lin, 2015). The various learning contents include lectures, handouts, online testing, discussion forums, peer review, real time faculty-students online meetings, and associated course contents obtainable through various open educational resources (OERs) such as open licensed textbooks, learning fora, YouTube, Wiki, Creative Common (CC) resources, social apps, etc.

Learners can decide their own learning pace, focus, sequence, and goal. Students can focus on certain topics in a course only or read all the topics of the course, listen to lectures or read handouts, jump into discussion forums or take online quizzes.

Students can follow the course's suggested learning sequence or determine their own preferred learning sequence such as reading the e-textbook before watching the online videos, doing the quizzes before reading the handouts, or joining the discussion forum before watching the lectures.

This learner is the master of his or her learning and decides his or her own learning aim. This could be mastering all the contents of the course, learning certain topics in the course, or just enjoying learning. MOOCs satisfy learners' various learning styles and needs.

B. Potential Feasibility as a Solution

The paper describes the following perspectives about the feasible of the features of MOOCs.

1. Experiencing university courses via MOOCs is better than other approaches

MOOCs could be a common way for HSSs to experience university learning because MOOCs offer university courses online for free and for all via the internet. To experience universities' teaching styles and contents, HSSs could choose the MOOCs they like and learn whenever and wherever they are free. No other learning opportunities offer a better way than MOOCs to experience quasi-real university learning, except actually sitting in a university classroom. The chance to actually sit in a college classroom is not available to most HSSs, since the class time at high schools is almost the same as at universities, not mention to location and budget issues. Only MOOCs can avoid these limitations and provide a common approach for all HSSs to experience university courses today.

2. Demonstrating one's ability through free MOOCs as reference data for application

The best way to select suitable university applicants is to see applicants' learning in real situations. The second best way would be to see applicants' learning in a simulated situation. Selecting university applicants through real situations would be costly and would also be limited to small groups only; thus, it would not be an efficient way and could not become available for all HSSs. MOOCs offer simulated university learning situations. This could serve as a better way to filter university applicants because MOOCs are free and for all HSSs, and students' learning results in MOOCs can be recorded automatically in a database for further assessment in the process of Personal Application. For example, Wharton School of the University of Pennsylvania offered a Business Foundations Specialization series (Accounting, Finance, Marketing, and Operations Management) through Coursera. Students who completed the four courses earned verified certification. Wharton also invites the top 50 performers each year to apply to its graduate business programs, waives the application fee, and offers up to five $20,000 scholarships (Wharton School of the University of Pennsylvania, 2015, February 11).

3. Learning from MOOCs to close the gap between the GSAT and the freshman year in college

Learning in MOOCs and earning MOOCs certifications or badges when applying for university admission will not only motivate HSSs to learn but also build a bridge to connect the gap between the senior year in high school and freshman year in college. This

bridge will help HSSs to see differences between learning in high school and college, inspire students' motivation to learn, and enhance the quality of learning in their last year in high school. We can find examples of high school students who have taken MOOCs, e.g., 5% of edX learners are high school students (Dennis, 2014); moreover, in Sebastian Thrun and Peter Norvig's Artificial Intelligence MOOC at Udacity, some learners are even junior high school students (Rodriguez, 2012). Therefore, for HSSs, MOOCs have potential to close the gap, and become a medium for HSSs overcome the difficulties of finishing the GSAT in high school and starting their freshman year in college.

4. Exploring interesting courses and thinking reflectively about one's own readiness

Supported by thousands of MOOCs, HSSs could find certain courses related to their interests, and further explore to see which courses fit their needs. If the course fits to their needs, they can register for the course immediately and begin their online journey to wisdom for free.

During online learning, all learning processes are recorded by servers and could provide detailed learning information for Personal Application. The learning information includes the percentage of content learners finished, learning sequences and frequency, assignment writing, online quizzes, etc. Colleges could use these data to assess student's strengths and weaknesses, select the right applicants, and make reports about all the students who have registered for the course to give students a chance to evaluate and think reflectively about their own learning.

HSSs could reflect upon the target department courses they have explored to see whether they really like this kind of learning, whether they are ready for this kind of study, or whether they have attained sufficient knowledge and skill in high school for further learning in college. Understanding this kind of information, HSSs could form a better learning plan in their senior year to improve their readiness for college.

IV. Reflection and Discussion

MOOCs may own high potential for HSSs to experience college learning, but we need to exam these potentials and related measures critically before applying them to

HSSs.

A. Many MOOCs Lack a User Friendly Gateway

The first frustrating problem the lack of a user-friendly gateway for HSSs to learn with MOOCs.

1. Many MOOCs are available but they are not specially designed for high school seniors

Taiwan has built many MOOCs in response to the booming trend of MOOCs worldwide. For examples, Tsing Hua University announced ShareCourse on 18 January 2013, Chiao Tung University cooperated with four other universities to created ewant in 2013, Taiwan Open University built TaiwanLife in 2014, the government has supported TaiwanMOOCs, which now has nearly two hundred courses online, and many other universities, such as Yuan Ze University, I Lan University, Chen Chi University, etc., have created their own MOOCs. However, none of them is designed especially for HSSs, except for the high school MOOC sub-catalog in ewant, and the scale of individual MOOCs does not include sufficient courses for HSSs to experience all of the courses in various departments. We need to unite them under a common gateway for HSSs.

2. Building a common gateway for high school seniors to access MOOCs

Moreover, the usage of these MOOCs for college admission purposes will be troublesome experiences for HSSs in Taiwan. Currently, students need to register to MOOCs at different colleges or other MOOCs platforms and they must learn to adapt to different learning formats in various MOOCs platforms. Laborious efforts such as filling out different register forms online, remembering a lot of account names and passwords, and adapting to different learning platforms will cost students a lot of energy and reduce their motivations to experience MOOCs.

Thus, ideally, HSSs need a common gateway to access all universities' MOOCs in Taiwan with a single account and password, and the government should play an active role to build or to encourage the formation of this common gateway for the public good and benefit of all students. This will save HSSs' time and let students focus on learning and experiencing courses.

3. High school seniors need a MOOCs user guide

Moreover, HSSs need a brief MOOCs user guide to lead guide them on an efficient

MOOCs journey. This could be similar to the guide provided by FutureLearn does (FutureLearn, 2015), or a user guide MOOC could be offered as a first MOOC for HSSs.

B. The Quality of MOOCs Is Doubted

The second problem is the quality of MOOCs may be below our expectations. Although MOOCs are largely taught by teachers at top universities, the nature MOOCs still leads to some doubts about their actual quality (Radford, Robles, Cataylo, Horn, Thornton, & Whitfield, 2014). These concerns include the lack of the traditional classroom interactions between teacher-students or student-student (Bass, 2014), losing the personalized experience (Head, 2014), lack of critical thinking (Nkuyubwatsi, 2013), and the need for quality assurance (Gasevic, Kovanovic, Joksimovic, & Siemens, 2014).

We need to improve the quality of MOOCs to give HSSs a qualified college learning experience; otherwise, we risk giving them a negative impression of college learning. The ways to improve the quality of MOOCs include using learning management systems to improve the quality of interaction (Moreillon, 2015) and revising the contents and pedagogy of MOOCs based on learners' feedback (Radford, Coningham, & Horn, 2015).

To improve the personalized experience, Igel (2014) suggested that MOOCs could be augmented with POOCs (personalized open online courses) and provide self-pace learning. Anderson (2013) has also found that powered by technology, individualized higher education is available online for all. For example, connectivist MOOCs (cMOOCs) incorporate factors of knowledge construction, authentic learning, and personalized learning experience (Gasevic, et al., 2014), offering a better learning approach.

To enhance learner' critical thinking, teachers also need to think critically to improve the course content, pedagogy, and engaging experience (van Rooij & Zirkle, 2016). MOOCs should never lead students away from encouraging the kinds of creative, critical, and reflective thinking required of students as thoughtful, engaged citizens capable of grappling with intricate problems and able to live productive and meaningful lives (Wharton-Michael, 2014).

Educators are still in the early stages of harnessing the potential of online learning (Means, Bakia, & Murphy, 2014). Although, as of now, MOOCs are imperfect, they are still better than other approaches, with the exception of actually sitting in a classroom,

because MOOCs present high quality knowledge and contents of higher education regardless of learners' educational background and physical locations without being subjected to special-temporal limitations (Lin, Lin, & Hung, 2015), provide flexible options to fit learners' various needs (Chang, Hung, & Lin, 2015), and all learners can access MOOCs by computer or smartphone with an internet connection (Chang, Hung, & Lin, 2015). Moreover, internet connectivity is ubiquitous in developed countries (Anderson, 2013). Thus, the quality of MOOCs is acceptable for HSSs, though there is still room for improvement.

C. The Completion Rate Is low

The completion rate in MOOCs is much lower than in traditional classroom courses. In fact, only 4 percent of students who began a University of Pennsylvania Graduate School of Education MOOCs completed the course (Wharton-Michael, 2014). Moreover, the majority of students to take MOOCs have a college degree or higher (Macleod, Haywood, Woodgate, & Alkhatnai, 2015). If college graduate learners' completion rate is low, HSSs' completion rate will be even lower. How can we suggest that HSSs learn using MOOCs? MOOCs providers or teachers are responsible for boosting the quality of course design to encourage and sustain the engagement of user (Terras & Ramsay, 2015).

Educators have tried various ways to retain students in MOOCs such as increasing the interaction opportunities for students, shortening lecture videos, creating online discussion fora, encouraging students to participate in online learning communities, creating problem solving based homework to inspire student's online teamwork, designing learning games to motivate students to learn, awarding certifications or badges for completion, offering learning and problem solving tips, monitoring students' progress and giving students suggestions for proper learning.

For example, McAndrew and Scanion (2013) suggested that online learning need not be a lonely journey, and it can offer ways for working collaboratively and benefit from peer interaction. Thus, following the rise of MOOCs, the role social networks has received more attention in education (Imlawi, Gregg, & Karimi, 2015). Participating in a learning network or learning community can motivate students' learning engagements (Terras, & Ramsay, 2015). Moreillon (2015) found that students can use a learning

management system (LMS) such as ApprenNet to increase interaction with their professor. Randall, Harrison, and West (2013) recommended that open badges could be used for senior high school education to motivate students to get badges from MOOCs. These efforts can reduce the attrition rate in MOOCs.

However, all learning processes and results are recorded in a database, regardless of what percentage students finish MOOCs. The various performances of students in MOOCs provide good information for assessing their potential in college. Thus, if we use MOOCs as a filtering mechanism, students' learning results can be distributed into norm-referenced lists. The norm-referencing results will not be affected by the low completion rate.

D. Lack of a Verified Mechanism

Most MOOCs lack a serious verified mechanism to prevent cheating. Based on honor codes, students act autonomy learners on platforms such as edX and FutureLearn, but honor codes are violated easily (Youngberg, 2012). Therefore, more serious verifying mechanisms are need to generate more reliable learning results for further use in Personal Application.

Coursera uses Signature Track to secure the reliability of verified certification. There are two steps in Signature Track. The first step is using a webcam to verify learner's portrait photo and photo ID photo. The second is verifying user's typing patterns in which student need to create a biometric profile of their unique typing patterns by typing a short phrase. When a student submits homework online, he/she is asked to type the same short phrase, which is compared to the recorded typing sample for verification.

Moreover, ewant cooperates with TaiwanLife to verify testing on the Learning Centers of Open University around Taiwan, and the concept is similar to that of the TOEFL iBT Test used in testing centers around the world. This offers a reliable and efficient way to verify learning results in MOOCs before a better and more reliable online testing is developed.

Another way is for college faculty members to meet HSS learners on high school campuses face-to-face to evaluate students' performance, select suitable candidates, and invite qualified students to apply to their colleges. In recent years, many universities ask

faculty members to go to senior high schools to recruit students, and teachers in MOOCs could join and visit learners in high schools. This would be an efficient way to verify learners' results and recruit the right candidates.

Universities could also invite MOOCs learners to visit their universities, have face to face interviews with MOOCs teachers, or take campus achievement test for the courses they have completed. Through this process, universities could select the right students, and students could get some firsthand information from universities.

Face to face meetings and paper tests could be given to a few target students in the final stage of Personal Application. This would reduce the cost of most students and verify the authenticity of the accepted students' performance.

E. Disadvantaged Students Lack Devices to Access MOOCs

Although we have a high internet penetration rate in Taiwan, 22% of population is still without access to the internet (Taiwan Network Information Center, 2014). If some HSSs have no chance to access the MOOCs for lack of related devices, it would become an unfair game for these students. Therefore, our government should plan some measures for these students to gain the equal chance to access MOOCs. For example, the government could give students computers with internet access; schools can open their computer classrooms for these students at noon, on weekends, or during winter and summer vacation; and libraries or community activity centers could support these needs too.

The newest high school curriculum reform is planning a higher percentage of elective courses (40 credit hours at least) in high schools starting in the 2018 school year (Department of Education, 2014), and the research suggests that some of these courses could be MOOCs. This could allow students to learn in school in a computer classroom under the guidance of a high school teacher. Thus, all students would have an equal chance to take MOOCs, and the learning process could be facilitated and monitored by teachers.

V. Ways for High School Seniors to Learn via MOOCs

After examining the feasibility of MOOCs for HSSs critically, this study has found that MOOCs could play a positive role for HSSs to experience college learning. I proposes several ways for HSSs to do so, as follows.

A. Browsing MOOCs and Selecting Interesting Courses

The priority is to create a common gateway for HSSs to experience college learning through MOOCs, and this gateway should have at least three ways for students to explore courses they may be interested in. First, students could browse courses by subjects: Chemistry or Physics, Engineering or Electronics, Economics or Law, Music or Literature, or Philosophy or Ethics under the subject areas such as Natural Science, Technology, Social Science, Art, or Humanity. This kind of course structure is similar to typical disciplines and colleges in Taiwan. It would be a familiar format that could help HSSs to find target courses easily.

Second, students could browse courses offered by individual departments at all of Taiwan's universities, and corresponding MOOCs offered by these universities. Though it is not possible to MOOCs corresponding to all of these courses, we expect that more and more such courses will be created soon.

Third, students could check suggested courses from individual department, and these suggested courses could be linked to the related MOOCs, which could be the courses designed or taught by the suggested department or other MOOCs platforms around the world. These suggested department courses represent the core courses for specific departments.

When students find an interested course through these ways, they can click the link directly to browse the course introduction information. If students like the course, students should have the chance to look at the detailed contents immediately because a brief introduction or online syllabus is not sufficient information for students to make up their minds about registering for the course. If students register for a MOOC based on insufficient information, there will be a high dropout rate in the future. For example, most MOOCs today only let registered students see detailed contents. This is one of the

reasons for the low completion rate. Personally, I have registered for nearly one hundred courses, just out of curiosity, to see the detailed course contents.

Moreover, if only registered students can see the detailed course contents, as with most MOOCs do now, students will face a dilemma. Even if they are curious about the course, they may fear that dropping out of a course will look bad on their records. Therefore, all courses in MOOCs for HSSs should allow potential students to explore content anonymously.

B. Taking Selected Courses

After browsing through sufficient course information, students will select interesting courses and be ready for further exploring. Students can register for the target course and experience it in-depth through various approaches.

Students can follow the designed sequence, such as reading the summary of course, watching the class videos, doing the short quizzes embedded in videos, studying the handouts, discussing with classmates or faculty in forums, writing homework essays, browsing the course suggested OERs, reviewing peers' assignments, taking online examinations, or joining students-faculty online meetings real-time.

Students can also learn at their own paces such as by focusing on handouts or lecture scripts. A high proportion of students who have completed MOOCs prefer this approach. Students can watch the lectures repeatedly or spend a lot of time on course related discussion fora. Students could learn all the contents or select parts as they like.

In MOOCs, the student is an autonomy learner and takes an active learning role, and the student's learning motivation (Anderson, 2013; Fischer, 2014) and self-regulation (Randall, et al., 2013; Zimmerman, 1990) are important components. These components support students' long term and stable achievement and are well worth further study.

C. Thinking Reflectively about one's Own Learning and Adapting the Learning in High School

No matter what kind of learning approaches students select, students should follow their passion. This is source of learning motivation and it can guide students towards their interests and suitable target departments or disciplines. During this process, students should think reflectively to evaluate which subjects motivate their engagement and

improve learning results (Firmin, et al., 2014), and what kind of teaching styles inspire their passion and encourage further learning (McAndrew, & Scanion, 2013).

After trying a few MOOCs, students could find suitable courses and make a self-regulated learning plan for these online courses because most of successful MOOCs learners are active learners who motivate themselves and practice self-regulated learning (Fischer, 2014; Zimmerman, 1990). At the same time, students should assess their readiness for courses corresponding to their target departments. If students find they are not ready for these courses, they could reflect upon their own learning in high school and make some adaptions to fine tune their learning and boost their readiness.

D. Creating Online Learning Profiles for Application and Further Learning

During learning in MOOCs, students could create electronic profiles or online portfolios to record their learning process and learning results such as learning notes, homework, essays, learning related badges, or completion certifications. Electronic profiles are free to create, easy to revise, flexible to adapt into various formats, portable to disk or online, can be used repeatedly, and are environmentally friendly.

A learning profile could offer important referent information for Personal Application, and completion certifications can be included into Senior High School Students' Learning Process Database, which is a government planned database for simplifying the process of Personal Application in the future.

Moreover, students could use the online profiles to share their learning and subjects of interest with other students, thus extending classroom learning through participation in world learning communities. If students could meet matched learning partners, it will be a good funnel to share ideas with each other, increase students' learning motivation, and inspire students' passion to explore further. Interaction with other peer learners can help students overcome the difficulties of the lonely online learning journey (McAndrew and Scanion, 2013) and increase the completion rate in MOOCs.

VI. Conclusion

The MOOCs trend has inspired school leaders, educational policy makers, and educators to foster a rich dialogue about MOOCs, to re-think and re-shape our curriculum and instructional strategies, and to prepare students for the challenges of the 21st century and beyond (Brahimi & Sarirete, 2015). The traditional ways to solve HSSs' university admission problems could draw insight from MOOCs and cooperate with MOOCs to offer HSSs better learning experiences, especially because MOOCs are free for all around the world without spatial-temporal limitation.

MOOCs are still in beginning stage and have various shortcomings. Thus, their courses are not a perfect solution yet. However, MOOCs are improving quality in regard to curriculum, pedagogy, and assessment via big data analysis based on tens of millions of learners around the world. MOOCs are not only the best solution in hand but also have high potential in the future for HSSs to experience university learning and extend their learning to broader learning communities around the world.

Some further issues are well worth exploring. What is the best strategy to build a common gateway for high school students to experience MOOCs? How could high school teachers incorporate MOOCs into high school courses? Further experimental design and empirical exploration of the learning experiences of HSSs in MOOCs are still necessary. Experiments to filter HSSs through MOOCs could serve as pilot studies for the further comprehensive practice.

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