

## Article

# A Concrete Study on Social-Media Connection of Global Literacy Abilities in MOOCs under the Dual Impacts of Lower Birth-Rate and COVID-19

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**Abstract:** In order to break through the dual impacts of lower birth rates and COVID-19, a majority of higher education institutions have commenced in providing a series of diversified Massive Open Online Courses (MOOCs) to effectively reduce these huge dual impacts. This research employed the Social Learning Theory (SLT) of educational doctrine for theoretical uses and the Factor Analysis (FA) approach of quantitative analysis and Trigonometrical Entropy Method (TEM) method of qualitative analysis for statistically purposes. These concepts were employed to explore the most critical social-media connection of global literacy abilities in MOOC. After a succession of assessed measurements, there are two most valuable findings. First, higher education institutions have to simultaneously and efficiently institute the Course Complete Rate of Course Assessment (CCR-CA), User Completely Unrestricted Operation of Course Operation (UCUO-CO) and Course Professionalization Technology Function of Course Function (CPTF-CF) into the course's design. Specifically, higher education institutions need to establish MOOCs features in Course Evaluation Technology Function (CETF), Course Professionalization Technology Function (CPTF) and Aggregation Technology Function (ATF) of MOOCs features into the current MOOCs. This is done in order to effectively promote the Individual Social Feature (ISF) of "social-media connection of global literacy abilities" for overcoming these serious dual impacts. In addition, higher education institutions have to also construct the social-media connection of global literacy abilities evaluation model for appraising Individual Social Feature (ISF) of each MOOCs participant. Second finding, higher education institutions should develop Convenience of Course Operation (C-CP), Feedback Technology Function of Basic Function (FTF-BF) and Connectionization of Course Operation (C-CO) of higher education strategies of developed sustainability into the course's structure. Further, they should also build Connectionization (CZ) of MOOCs features into the current MOOCs in order to efficiently foster Application Programming Interface (API) of social-media connection of global literacy abilities for conquering these serious dual impacts as well.

**Keywords:** social-media connection; global literacy abilities; MOOCs features; higher education strategies of developed sustainability; social learning theory (SLT); factor analysis (FA); trigonometrical entropy method (TEM)



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## 1. Introduction

Nowadays, with respect to the foreign higher education recruiting challenge, national higher education graduates employment austerity and rapidly declining birth-rates, the majority of higher education institutes have commenced to confront the recruiting insufficiency as an unprecedented and unrepeatable threat; specifically, according to the latest annual higher education statistic report of the Taiwanese Ministry of Education, not only

were up to 151 public and private universities departments unable to recruit any senior higher graduates, but the registration rates of 268 departments were also lower than 30% in 2019. Significantly, the graduate programs recruiting is a more rigorous baptism of fire because up to 64 graduate programs had a zero registration rate and furthermore, seven of these graduate programs, including art, drama, humanities, society, ecology, creature evolution, translation and social-work were at National Taiwan University which is ranked in first place in Taiwan. Furthermore, more and more talented students have chosen to study not only at famous American universities' Asian branches such as New York University at Shanghai Campus, Wenzhou at Kean University Campus, Duke Kunshan University-Wuhan University at Shanghai, Bryant University-Beijing Institute of Technology at Zhuhai, Sichuan University-Pittsburgh Institute, John Hopkins School of Advanced International Studies at Nanjing Campus University of Michigan-Shanghai Jiaotong University Joint Institute and etc., but also higher ranking international universities such as University of Hong Kong, University of Singapore, Tsinghua University, Peking University and so on. Since 2015, due to the influence of the rapidly declining birth-rate, the number of registered freshman was 269,000 and then, with reference to the statistical forecast in the 2019 official report of the Taiwanese Ministry of Education, there will be only 157,000 senior high graduates than can be recruited in 2028 which means 112,000 (42%) senior high graduates are going to disappear. In order to address this registration rate insufficiency at Taiwanese higher education institutes, the Ministry of Education has instituted a series of educational strategies in the New Southbound Policy for attracting foreign students, and as a result there were up to 13,091 college freshmen from Malaysia, 7854 college freshman from Vietnam, 7695 college freshmen from Hong Kong, 7347 college freshman from Indonesia and so on. Momentously, the number of full registration Taiwanese higher education institutes was on average 83.9% in 2019 which means there are 16.1% (approximately 42,000 senior high graduates) who choose to register and study in foreign universities or more senior high graduates deemed that higher education would apparently not enhance their employability after obtaining the higher education diploma. According to the latest statistical report of the Taiwanese Ministry of Education, the Taiwanese higher education institutions has increased to over 190 organizations since 2011. These Taiwanese Higher education institutions, in 2016, included 126 public and private universities, 46 public and private colleges, 19 public and private continuing studies colleges and two public open (online education) universities. According to the official announcement of the World Health Organization (WHO) on 11 March 2020, the Coronavirus Disease 2019 ("COVID-19") [1] has been defined as a global pandemic infectious disease that has resulted in a loss of approximately \$12 billion (USD) in revenue for global companies. Moreover, the COVID-19 outbreak has increased unemployment globally with up to 23 million people laid off at its height in USA according to the official report from Bridgewater Associates. COVID-19 has also had a sizable impact to countries' economies with considerable declines in the Gross Domestic Product (GDP) such as Germany's 20% GDP decline, while other countries' GDP dropped to negative numbers such as Japan's  $-1.2\%$  GDP, South Korea's  $-0.6\%$  GDP and Singapore's  $-0.85\%$  GDP. COVID-19 has led to unprecedented national border crossing and individual gathering restrictions. According to the Taiwanese Statistic Report, approximately 11% (1.2 million) Taiwanese workers have been laid off since the start of the pandemic. In order to avoid large-scale COVID-19 infections, educational institutions across the world, including United States, United Kingdom, Japan, Korea, France, Italy and so on have shifted to online courses to replace traditional "face-to-face" teaching. Many renowned colleges and universities such as Harvard University, Princeton University, Columbia University, Massachusetts Institute of Technology, University of Cambridge and so forth have instituted a series of online-course emergency measures in place of current face-to-face courses. The Ministry of Education in Taiwan has also commenced a series of online-course supporting measures, policies and regulations to ensure students' right to education without the influence and shock of COVID-19 [2,3]. National Tsing Hua University in Taiwan was one of the first to commence online teaching on 24 March 2020 when

26 students and one professor had contact with a confirmed COVID-19 patient. National Chengchi University in Taiwan has also transitioned to online teaching over face-to-face courses. However, according to the official Teaching and Learning International Survey (TALIS) of the Organization for Economic Cooperation and Development (OECD) in 2018, the only 15 percent of the Taiwanese junior high schools have utilized Information and Communication Technology (ICT) in their lecture procedures, compared with the average 53 percent of the entire OECD members. Since 2000, the Ministry of Education in Taiwan started to advocate diversified technologies (information technology, digital technology, wireless technology and so on so for) to change student's one-way-listen-learning methods, teacher's one-way-talk lecturing measures and classroom's one-way-order managing manners. Remarkably, in 2018, there were 171,648 (54.6%) senior high graduates registered in technology-related departments; nevertheless, only 114,863 (42.7%) senior high graduates to register in the technology-related departments. contradiction

However, before the COVID-19 pandemic, not only the contemporarily innovative technological education has been used, depending on social media channels to obtain news, information and knowledge by means of manipulating computer, communication and consumer (3C) electronic devices with social-media function platforms, such as the Google search engine, YouTube videos, Facebook, Instagram and so on, due to the expeditious hardware and software developments of telecommunication and wireless technologies but the Ministry of Education has also instituted a series of "technological education" courses, such as Science, Technology, Engineering and Math (STEM) in the Curriculum Guidelines of 12-Year Basic Education General Guidelines. Critically, the general senior higher graduates are supposed to be more interested in registering in technology-related departments, but the statistical report of the Taiwanese Ministry of Education obviously describes the opposite situation. Based on the empirical reports from the Department of information and technological education of the Ministry of Education in Taiwan, there were up to 341 official Massive Open Online Courses (MOOCs) provided by up to 63 Taiwanese universities and colleges in 2018. Significantly, based on the official reports from the Department of Information and Technological Education of the Ministry of Education in Taiwan in 2020 after the COVID-19 outbreak, the only 12% of Taiwanese MOOCs registered users could obtain the official online-course subject-credit and degree certificates. The reasons are [4]: (1) Teachers are not willing to redesign their course's content for online learning, (2) teachers are not willing to acquire the needed proficiencies in using the new technologies for the online courses, (3) the difficulty in evaluating students' attendance in an online environment, (4) parents' difficulty in assessing a student's learning performance, and (5) companies' reservations regarding the student evaluation system employed with online courses. In order to effectively solve these critical issues to strengthen student's self-regulation learning performance, advancing the educational institution's evaluation system and enforcing corporate recognition and identification [5]. Sentence is unfinished—has no conclusion On the other hand, in order to effectively provide higher quality a series of related online courses should not only to efficiently stimulate students' learning motivation and interest but also to effectively advance student's learning performance in order to empirically cultivate student's professional literacy, the Ministry of Education and Ministry of Economy Affairs, and Taiwanese Executive Yuan have effectively and systematically constructed seven MOOCs for directly provide a series of professional online education courses and training programs according to the swift development and popularization of Internet Technology (IT), wireless transmission, telecommunication technologies in Taiwan. Extraordinarily, the majority of students and employees not only surf and download up-to-date course information and knowledge but also share and upload on-time learning situation and information in these MOOCs through 3C electronics devices with IT functional services [6] without the geographic and time limitation of traditional face-to-face educational circumstances. In view of the sustainability perspective of Taiwanese HR institutes, these MOOC courses are able always be repeatable for each registering student so Taiwanese Higher educational institutions can expend the lowest

costs for creating courses and achieve the highest profits and benefits [7–11]. In detail, these MOOCs include the Small and Medium Enterprises Learning website (Smelearning) and the Industry-university Cooperation Talent Training Information Website (IUCTTI) of commercial pursuits as well as Taiwanese Institution of Information Industry, III (III Proera), Homogeneous Educational Platform (HEP), National Tsing Hua University, NTHU (NTHU sharecourse), National Chiao Tung University Ewant (NCTU ewant), National Chiao Tung University Taiwan Life (NCTU Taiwan LIFE) and National Taiwan University (NTU Coursera). From a long term point of view for the specific characteristics of MOOCs, not only the course materials and lectures have to transform from traditional single disciplinary courses into digital interdisciplinary courses in MOOCs but also MOOCs students come from the global pool of higher education students [12]. Therefore, according to the huge influence of globalization on the interplay and connections among each nation through concrete transportation and abstract social-media, the Programme for International Student Assessment (PISA) of OECD aims to increase “global literacy” to be one of the most critical major domains in 2018 for the broadest range of students because the world has become diversified and is undergoing dynamic changes with lots of complex issues, economic rapid inflation, the broad impact of digital technology, multiple culture conflicts and various environmental populations. The definition of “Global Literacy” is that each individual (student) has a diversified capacity to analyze global and cross-culture issues under the presupposition of respecting human dignity in order to not only to completely understand how prejudice affects individual standpoints and judgements, but also to communicate with partners from multiple cultural backgrounds through open, proper and effective methods to advance the benefits of the entire society and sustainable development. Therefore, in order to confront the most momentous dual impacts of a lower birth-rate and COVID-19, the majority of higher education institutions have to establish a series of learning-oriented interdisciplinary MOOCs in diversified subjects to effectively and efficiently cultivate course participants’ global literacy to strengthening their developed sustainability in this most series lower-birth-rate and COVID-19 era.

However, according to a widespread survey on related studies [13–16] of social media, MOOCs and higher education sustainability and student’s literacy, there is no research able to consolidate these interdisciplinary subjects together in order to deeply assess their interactive dependences. Hence, this interdisciplinary global literacy research project aims to break down the major research mainstream question: “How to explore the most critical determinants of social-media connection of global literacy abilities in MOOCs for developing the higher education sustainability under the dual impacts of lower birth-rate and COVID-19?” has been broken by the Social Learning Theory (“SLT”) of educational doctrine as the three most critical research questions [17]. Significantly, “Social-media Global Connection of Global Literacy Abilities”, “MOOCs Features of Organization Development”, “Higher Education Strategies of Developed Sustainability” were able to be synthetically outlined by the trigonometric analyses of the Social Learning Theory (“SLT”) to comprehensively assay this major research mainstream [18]. The reasons are each dependence and influence among three essential dimensions (individualism-individual aspect, organizationism-organization aspect and socializationism-society aspect) are discussed in detail and evaluated in SLT theory. The reasons are: (1) individualism was able to directly affect the organizationism and socializationism perspective as individuals are the basic unit for organization and society; (2) organizations must indirectly impact individuals and society as humans necessarily live in groups and majority decisions exist in society and finally, (3) socializationism reversely influences on organization and individual since majority rule always dominates individual thinking and organization development tendencies [19,20]. In order to comprehensively solve the three most critical research questions, this interdisciplinary global literacy study has expanded a series of research results and analytical consequences of authors’ accumulated publications on global literacy, technological education, MOOCs and student’s learning behavior. It refined in depth the “Social-media Connection of Global Literacy Abilities” for “Individual standpoint: how to materialize



the most effective and efficient global literacy evaluation model?; “MOOCs Features of Organization Development” for “Group standpoint: How to concretely establish the most effective and efficient global literacy evaluation model in MOOCs of higher education institutions?” and “Higher Education Strategies of Developed Sustainability” for “Social standpoint: how to develop the most effective and efficient global literacy evaluation model in MOOCs to induce the most critical MOOCs global literacy determinants to activate the developed sustainability of higher education institutions to confront the most serious dual impacts of lower-birth-rates and COVID-19?”. These three research questions are the interdisciplinary analytical criteria to concretely establish the most effective and efficient evaluation model to identify the most critical determinants of global literacy in MOOCs [21] in this research.

## 2. Research Literature

### *Publications on Main Research Theory*

Recently, due to the rapid development of technological applications in teaching innovation, the trigonometrical interactive dependences and correlations of SLT theory has been employed in order to discuss and assess the interplays among “Social-media Global Literacy Abilities of Global Connection”, “MOOCs Features of Organization Development”, “Higher Education Strategies of Developed Sustainability” from three brief analytical perspectives: the student’s perspective (individualism - individual behaviour), educational institutions’ perspective (organizationalism - group conditions) and the social perspective (socializationism—social circumstance) in consideration of most of the research theory in this study, based on the main originality and development of SLT [22]. Significantly, individualism is illustrated by the individual behaviors; the organizationalism is described by group conditions and socializationism is expressed as the social development tendency, as described in Figure 1.



**Figure 1.** The affected cycle of SLT of educational doctrine.

In Figure 1, there are three interactive-circle dependences and correlations among individualism, organizationalism, and socializationism of SLT brief analytical perspectives and in detail, these interactive-circle influenced dependences and correlations cover what? [23]: Firstly, individualism can be described as the concept that individuals are the essential basis in each organization and society, and at the same time, individual behavior does is not only naturally composed of an organizational structure, but also plays a key-role in leading social developed tendencies. Secondly, organizationalism can be expressed as the concept that the organization is made up by each individual and therefore, organization conditions can indirectly influence each individuals’ concept and behavior and thirdly, socializationism can be presented as the notion that society is moderately

constructed from each group and obviously, group conditions are able to directly impact social development and tendencies. Eventually, a final expanded expression of individual behavior and group condition integration in the entire social and on the contrary, social development and tendencies are able to synthetically influence each individual behavior and group development [24].

In association with the consolidation between Figure 1 of the affected cycle of SLT of educational doctrine and the three brief research questions, the main research assessment framework was constructed as shown in Figure 2.

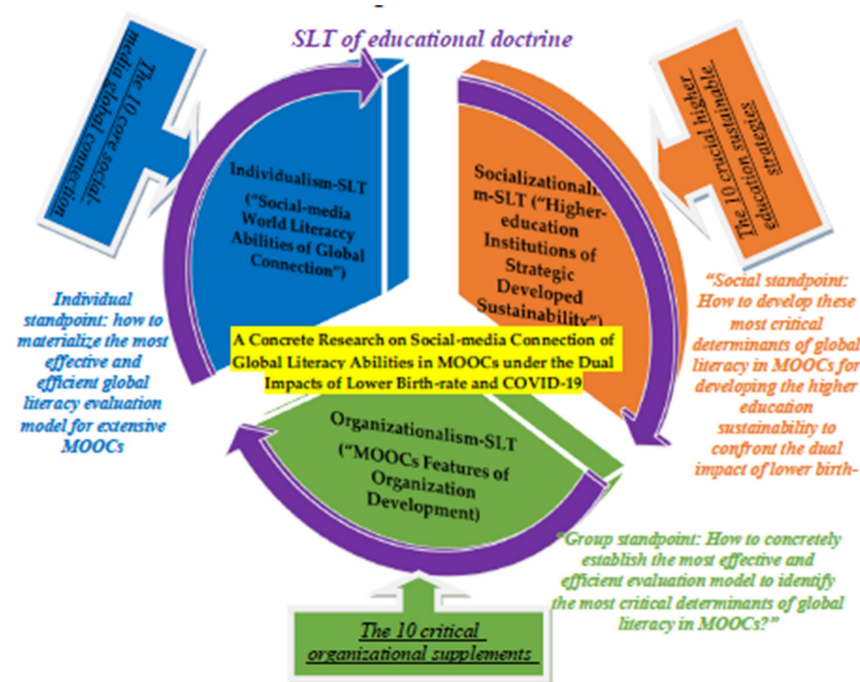


Figure 2. Main research assessed framework.

### 3. Research Design

#### 3.1. Research Method

In order to completely respond to the three research questions, the Multiple Criteria Decision Making (MCDM) methodology was applied in a succession of assessed measurements to examine the interactive correlations among "social-media connection of global literacy abilities", "MOOCs features of organization development" and "higher education strategies of developed sustainability" of the three analytical dimensions (individualism-individual aspect, organizationism-organization aspect and socializationism-society aspect). Further, the questionnaires design were illustrated the 30 evaluated criteria by utilizing a 5-Likert question-scale in each question. Specifically, the Factor Analysis (FA) approach of quantitative analysis was first employed to execute large-scale weighted questionnaires among 100 random higher education students and faculty with higher research representativeness and validity. In consideration of higher research accuracy and reliability, the Trigonometrical Entropy Method (TEM) of qualitative analysis was secondly applied in the evaluated implementation of professional weighted questionnaires by means of a series of professional expert's weighted questionnaire comparison matrices from interdisciplinary experts with higher research experience and reliability in discussion with the interactive correlations and dependence among "social-media connection of global literacy abilities", "MOOCs features of organization development" and "higher education strategies of developed sustainability" by exploring interdisciplinary global literacy in MOOCs under the dual impacts of lower birth-rate and COVID-19.

### 3.1.1. Factor Analysis of Quantitative Analysis

In terms of the increment of research representativeness and validity in the appraised measurements of surveyed questionnaires, the FA quantitative analysis approach was systematically created for identifying, detecting and refining each criterion range, connections and dependences and the reason is that the FA quantitative analysis approach was originated to conduct calculations and measurements of each criterion. The evaluated criteria could be classified as the dependent and independent variables and the dependent variables (directly observed impact-measured factors) were illustrated as  $Y(y_1, y_2, \dots, y_k)$  while independent variables (direct unobserved influenced factors) were expressed as  $X(x_1, x_2, \dots, x_k)$ . Specifically, the weights constants ( $W(W_{ij})$ ) presented as evaluated variable loadings of each evaluated criterion and variable-weights of overall assessed criteria under the linear combination Equation (1) [25,26] can be described as follows:

$$X_1 = \lambda_{11}Y_1 + \lambda_{12}Y_2 + \dots + \lambda_{1k}Y_k$$

$$\text{s.t. 1: } Y_- = P^1 X_-, X_- = P^1 Y_-$$

$$\text{s.t. 2: standardize intersection of variance to be 1 (Max)}$$

If maximization:  $X_k - u_k = \lambda_{k1}f_1 + \lambda_{k2}f_2 + \dots + \lambda_{km}f_m + e_k$  (s.t.  $(X - u)_{-k \times 1} = \wedge_{m \times m} f_{m \times 1} + e_{-k \times 1}$ ) the variance-covariance matrix presents as:

$$\sum = \wedge \Phi \wedge^1 + \Psi, \Psi = \text{diag}(\Psi_1, \Psi_2, \dots, \Psi_m) \text{ (s.t. } \Phi = I_{m \times m} \text{)} \quad (1)$$

### 3.1.2. Trigonometrical Entropy Qualitative Analysis Method

In order to enforce the research validity and accuracy in the diversified study of the interactive dependences and relationships among “social-media characteristics of global connection”, “MOOCs features of organizational supplements” and “higher-education institutions of strategic developed sustainability” from three brief analytical perspectives: student’s individualism perspective, education institution organizationalism perspective and social socializationism perspective (—social circumstance), the trigonometrical assessments and measurements of the TEM method of qualitative analysis has been applied to verify and refine the analytical consequences of the FA quantitative analysis approach by means of weight-measurements of 10 experts’ and professional questionnaires [27,28]. In view of the basic development of the TEM qualitative analysis method, it was created to extensively establish a trigonometrical weight pairwise comparisons matrix. As a result, the “discrete probability connections” relationship-compared measurements of each appraised criterion were represented as  $(P_1, P_2, \dots, P_k)$ , and furthermore, the equation of the TEM qualitative analysis method was further illustrated as:

$$E(P_1, P_2, \dots, P_k) = -\varnothing_k \sum_{i=1}^k P_i \ln(P_i) \quad (2)$$

s.t.  $\varnothing_k = 1/I(k)$  was the normal quantity and  $0 \leq E(P_1, P_2, \dots, P_k) \leq 1$ . Particularly the number of  $(E(p_1, \dots, p_k))$  was reversely related with the interactive dependences and relationships between each assessed criterion. Continuously, the interactive dependences and relationships of the “discrete probability connections” relationship-compared measurements could be calculated and utilized in the measurement-conditional trigonometrical weight  $(H(Y|X))$  [29,30] deduced as follows:

$$\begin{aligned}
H(Y/X) &= \sum_{x \in X} p(x) * H(Y/X = x) \\
&= - \sum_{x \in X} p(x) * p(y/x) \log p(y/x) \\
&= - \sum_{x \in X} \sum_{y \in Y} p(x, y) \log p(y/x) \\
&= - \sum_{x \in X, y \in Y} p(x, y) \log p(y/x) \\
&= - \sum_{x \in X, y \in Y} p(x, y) \log(p(y/x)/p(x)) \\
&= \sum_{x \in X, y \in Y} p(x, y) \log(p(x)/p(x, y))
\end{aligned} \tag{3}$$

### 3.2. Research Criteria

Specifically, the 10 core Social-media Connection of Global Literacy Abilities were directly and positively defined as the appraised criteria and these are the Application Programming Interface (API); Content Reality (CR); Conversations Feature (CF); Device accessibility (DA); Identity feature (IF); Individual Social Feature (ISF); Keyword-search Engine (KE); Multiple Device Accessibility (MDA); Social networking Communication Channel (SNCC) and Web 3.0 (W3) [31]. The 10 critical organizational supplements in MOOCs were intensively and apparently clarified as the assessed criteria of MOOCs features of organization development and these are the User Completely Unrestricted operation (UCUO), Convenience (C), Connectionization (CZ), Openness (O), Course completion Rate (CCR), Feedback Technology Function (FTF), Course Evaluation Technology Function (CETF), Aggregation Technology Function (ATF), Course Professionalization Technology Function (CPTF) and Re-purposing Technology Function (RTF") [32]. Ultimately, the 10 crucial higher education sustainable strategies were obviously circumscribed as higher education strategies of sustainability development and these are the Aggregation Technology Function of Basic Function (ATF-BC), Course Evaluation Technology Function of Course Function (CETF-CF), Course Professionalization Technology Function of Course Function (CPTF-CF), Feedback Technology Function of Basic Function (FTF-BF), Re-purposing Technology Function of Basic Function (RTF-BF), Connectionization of Course Operation (C-CO), Openness of Course Content (O-CC), Convenience of Course Operation (C-CP), Course Complete Rate of Course Assessment (CCR-CA) and User Completely Unrestricted Operation of Course Operation (UCUO-CO) [33]. Figure 1 conclusively illustrates the main research conceptual framework for this interdisciplinary study in order to achieve the main research goal.

### 3.3. Questionnaire Collection

In consideration of the higher research validity and reliability of the questionnaire evaluation, a 5-Likert scale was used in the large-scale and expert questionnaires that were completed by 100 current higher education students in the appraised calculations of the FA quantitative analysis approach for higher research reliability and representativeness. In order to achieve higher research validity and accuracy, [34] stated that there are the less errors of validity and reliability in the Delphi method during evaluation of collected experts' and professional questionnaires of surveyed data. As a result, 10 experts and professionals were interviewed for the assessed compared weight-measurements of each assessable criterion of the TEM qualitative analysis method in order to establish trigonometric interplays between each criterion of the "social-media connection of global literacy abilities", "MOOCs features of organization development" and "higher education strategies of developed sustainability". Specifically, the two-way positive and negative comparisons was calculated in a 5-Likert's scale of the collected questionnaire data of the FA quantitative analysis approach and TEM qualitative analysis method.



### 3.4. Questionnaire Interviewees

In association with higher research reliability and representativeness, 100 current higher education students were randomly surveyed on the comprehensive measurements of the FA quantitative analysis approach. These 100 questionnaires were collected during random and in-person interviews of students from the cities of Taipei (representing the northern region), Taichung (representing the western region), Kaohsiung (representing the southern region), and Hualien (representing the eastern region) in Taiwan. In advancement of research validity, 10 experts and professionals were surveyed for the comparison matrix of the TEM qualitative analysis method and these 10 experts and professionals included six scholars with over 5 years of research experience in the related research fields of the “social-media connection of global literacy abilities”, “MOOCs features of organization development” and “higher education strategies of developed sustainability”. Subsequently, another four professionals with over 3 years of practical research experience in global literacy-related research fields were added.

## 4. Research Measurements

### 4.1. FA Quantitative Analysis Measurement Approach

Firstly, the large-scale weight-questionnaires were designed to collect data from 100 current higher education students through random and in-person interview collection in Taipei, Taichung, Kaohsiung and Hualien. The number of valid questionnaires collected among these 100 random interviewed questionnaires was 87. The descriptive statistics of these 87 valid interview questionnaires are given in Table 1.

**Table 1.** The descriptive statistic of the FA approach.

Gender	Male: 43 (49.425%)
	Female: 44 (50.575%)
Geography	Northern Taiwan <sup>1</sup> : 23 (26.44%)
	Middle Taiwan <sup>2</sup> : 32 (36.78%)
	Southern Taiwan <sup>3</sup> : 21 (24.14%)
	Eastern Taiwan <sup>4</sup> : 11 (12.64%)
Use of MOOCs hours/per day	One hour: 60 (68.96%)
	Two hours: 19 (21.83%)
	Three hours: 5 (5.77%)
	Four hours: 2 (2.29%)
	Over four hours: 1 (1.15%)
Have you taken MOOCs through social media channels for learning?	Yes: 73 (89.79%)
	No: 14 (16.1%)

**Table 1.** *Cont.*

Have you taken any MOOCs from higher education institution web-sites for studying?	Yes: 24 (27.59%)
	No: 63 (72.41%)
Will you consider the professionalism of MOOCs before you take to learning?	Yes: 62 (71.26%)
	No: 25 (28.74%)

<sup>1</sup>: Chilung, Taipei, New Taipei, Taoyuan and Hsinchu cities. <sup>2</sup>: Miaoli county, Taichung city, Changhua, Nantou and Yunlin counties <sup>3</sup>: Chiayi city and county, Tainan and Kaohsiung cities, Pingtung and Penghu counties <sup>4</sup>: Hualien and Taitung counties.

According to Equation (1) of the FA quantitative analysis approach, not only was the analytical number of the Kaiser-Meyer-Olkin measure of sampling adequacy 0.751, which was higher than 0.7, but the assessed numbers of significance of the Kaiser-Meyer-Olkin measure and Bartlett test of was also 0 . . . . , which was lower than 0.05 in Table 2. Apparently, the FA quantitative analysis approach was definitely applicable to measure the valid weight questionnaires of 87 current higher education students.

**Table 2.** The KMO and Bartlett's Test of FA approach of quantitative analysis.

Kaiser-Meyer-Olkin Measure of Sampling Adequacy		0.751
Bartlett test of sphericity	Chi-squared test	860.653
	df	435
	Significance	0

In succession, Table 3 expresses the commonality of each assessed criterion in the FA quantitative analysis approach and the API (0.832), DA (0.821), IF (0.778), ISF (0.759) and MDA (0.736) of "Social-media Connection of Global Literacy Abilities" were higher than 0.7, which means these five assessed criteria were better associated correlations for the research topic and questions. Additionally, CZ (0.887), O (0.849), CETF (0.819), CPTF (0.815), ATF (0.81), C (0.754) and UCUO (0.753) of "MOOCs features of organization development" were higher than 0.7, which means these seven assessed criteria were better illustrated correlations of the research topic and questions. Finally, CCR-CA (0.854), C-CP (0.791), UCUO-CO (0.779), CETF-CF (0.771), CPTF-CF (0.769), FTF-BF (0.764), O-CC (0.747) and C-CO (0.726) of "higher education strategies of developed sustainability" were higher than 0.7, which means these eight assessed criteria were better expressed correlations of the research topic and questions. As a result, the 30 original evaluation criteria were not only evaluated, but also refined as the 20 more core evaluated criteria through the FA quantitative analysis approach to achieve higher research validity and representativeness.

**Table 3.** The commonality of each assessed criterion in FA approach of quantitative analysis.

Criteria	Initial	Extraction
API	1	0.832
CR	1	0.569
CF	1	0.678
DA	1	0.821
IF	1	0.778
ISF	1	0.759
KE	1	0.676

Table 3. Cont.

Criteria	Initial	Extraction
MDA	1	0.736
SNCC	1	0.696
W3	1	0.674
UCUO	1	0.753
C	1	0.754
CZ	1	0.887
O	1	0.849
CCR	1	0.655
FTF	1	0.681
CETF	1	0.819
ATF	1	0.81
CPTF	1	0.815
RTF	1	0.434
ATF	1	0.258
CETF-CF	1	0.771
CPTF-CF	1	0.769
FTF-BF	1	0.764
C-CO	1	0.726
O-CC	1	0.747
C-CP	1	0.791

#### 4.2. TEM Method of Qualitative Analysis Measurements

After implementing the FA quantitative analysis approach, the TEM qualitative analysis method was hierarchically utilized to measure the weight-questionnaires of 10 experts and professionals to verify and refine the assessed consequences of FA quantitative analysis approach. Table 4 illustrates the weight-questionnaires measured result of the TEM qualitative analysis method.

Table 4. 10 professional expert's weight-questionnaires measured consequence of TEM method.

"Higher Education Strategies of Developed Sustainability"								"Social-media Global Connection of Global Literacy Abilities"	"MOOCs Features of Organizational Supplements"						
CCR-CA	C-CP	UCUO-CO	CETF-CF	CPTF-CF	FTF-BF	O-CC	C-CO		CZ	O	CETF	CPTF	ATF	C	UCUO
0.2874	0.4112	0.2467	0.3814	0.2005	0.502	0.3842	0.2586	API	0.2754	0.1611	0.3628	0.2263	0.0361	0.3554	0.2204
0.1663	0.2874	0.1869	0.4858	0.1903	0.2204	0.2754	0.2136	DA	0.1041	0.1658	0.2648	0.2211	0.2757	0.4542	0.1716
0.0602	0.2204	0.1137	0.2874	0.2005	0.2411	0.3842	0.2144	IF	0.076	0.1822	0.0791	0.1722	0.1815	0.2765	0.2968
0.3968	0.0602	0.3382	0.1578	0.3842	0.1059	0.3842	0.1963	ISF	0.2068	0.1377	0.403	0.2977	0.3314	0.2765	0.206
0.1903	0.0361	0.2359	0.0201	0.1760	0.1059	0.4112	0.0476	MDA	0.0567	0.0646	0.0439	0.2665	0.0651	0.1749	0.376

Table 4 describes the measured consequences of the TEM qualitative analysis method to detect the interactive relationships among the five core social-media connection of global literacy abilities, seven critical organizational supplements in MOOCs and eight crucial higher education sustainable strategies. In detail, CCR-CA (0.3968), UCUO-CO (0.3382) and CPTF-CF (0.3842) of "higher education strategies of developed sustainability" and CETF (0.403), CPTF (0.2977) and ATF (0.3314) of "MOOCs features of organizational supplements" were directly and definitely positively to advance ISF of "Social-media Connection of Global Literacy Abilities". Subsequently, C-CP (0.4112), FTF-BF (0.502) and C-CO (0.2586) of "Higher Education Strategies of Developed Sustainability" and CZ (0.2754)

of “MOOCs features of organizational supplements” were positively and precisely able to enforce API of “Social-media Connection of Global Literacy Abilities”. Summarily, CETF-CF (0.4858) of “higher education strategies of developed sustainability” and C (0.4542) of “MOOCs features of organizational supplements” were distinctly and apparently DA of “Social-media Connection of Global Literacy Abilities” as well as O-CC (0.4112) of “higher education strategies of developed sustainability” and UCUO (0.376) of “MOOCs features of organizational supplements” were strictly and obviously able to strengthen MDA of “Social-media Connection of Global Literacy Abilities”.

#### 4.3. Combination of the FA Quantitative Analysis Approach and the TEA Qualitative Analysis Model

Furthermore, each commonality of the 20 evaluated criteria from the FA quantitative analysis approach were directly consolidated into the measured results of the TEA qualitative analysis model as demonstrated in Table 5.

**Table 5.** Consolidated weight-measurement results of FA approach and TEM method.

“Higher Education Strategies of Developed Sustainability”								“MOOCs Features of Organizational Supplements”							
CCR-CA (0.854)	C-CP (0.791)	UCUO-CO (0.779)	CETF-CF (0.771)	CPTF-CF (0.769)	FTF-BF (0.764)	O-CC (0.747)	C-CO (0.726)	“Social-media Connection of Global Literacy Abilities”	CZ (0.887)	O (0.849)	CETF (0.819)	CPTF (0.815)	ATF (0.81)	C (0.754)	UCUO (0.753)
0.2042	0.2706	0.1467	0.2446	0.1283	0.3191	0.2261	0.1562	API (0.832)	0.201	0.1138	0.2472	0.1534	0.0243	0.223	0.1381
0.1166	0.1866	0.1126	0.3075	0.1202	0.1382	0.1689	0.1314	DA (0.821)	0.0672	0.1159	0.1689	0.1475	0.2197	0.2953	0.1028
0.04	0.1356	0.0642	0.1724	0.12	0.1433	0.2233	0.1362	IF (0.778)	0.0455	0.1221	0.0425	0.1055	0.1286	0.1554	0.182
0.2572	0.0361	0.2432	0.0924	0.2242	0.0614	0.2178	0.097	ISF (0.759)	0.1321	0.0873	0.2556	0.1922	0.2528	0.1516	0.1166
0.1196	0.021	0.1579	0.0114	0.0996	0.0595	0.2388	0.0229	MDA (0.736)	0.0317	0.0376	0.0218	0.1638	0.0398	0.0876	0.2279

Significantly, as illustrated in Table 5, CCR-CA (0.2572), UCUO-CO (0.2432) and CPTF-CF (0.2242) of “higher education strategies of developed sustainability” and CETF (0.2556), CPTF (0.1922) and ATF (0.2528) of “MOOCs features of organizational supplements” were directly and definitely positively to the advanced ISF of “Social-media Connection of Global Literacy Abilities” that is the same as the TEM qualitative analysis evaluated method results. Specifically, C-CP (0.2706), FTF-BF (0.3191) and C-CO (0.1562) of “Higher Education Strategies of Developed Sustainability” and CZ (0.201) of “MOOCs features of organizational supplements” were positively and precisely able to enforce API of “Social-media Connection of Global Literacy Abilities” which is also similar to the evaluated TEM qualitative analysis method results. Ultimately, CETF-CF (0.3075) of “higher education strategies of developed sustainability” and C (0.2953) of “MOOCs features of organizational supplements” were distinctly and apparently DA of “Social-media Connection of Global Literacy Abilities” and O-CC (0.2388) of “higher education strategies of developed sustainability” and UCUO (0.2279) of “MOOCs features of organizational supplements” were strictly and obviously able to strengthen MDA of “Social-media Connection of Global Literacy Abilities” that are similar to the evaluated TEM qualitative analysis method results.

## 5. Conclusions and Recommendations

Looking out upon the most serious dual impacts of lower birth-rate and COVID-19, the majority of higher education institutions have commenced to provide a series of diversified MOOCs to effectively reduce their grave difficulties. This research employed SLT of educational doctrine to not only break down the major research mainstream topics into three brief questions from three analytical dimensions (individualism-individual aspect, organizationism-organization aspect and socializationism-society aspect) by means of executing measurements of three essential evaluated factors: “Social-media Connection of Global Literacy Abilities”, “MOOCs features of organization development” and “higher education strategies of developed sustainability”. After a succession of assessed measurements of large-scale questionnaires of the FA quantitative analysis approach and experts’ and professionals’ TEM qualitative analysis method questionnaires, there are three most valuable findings and solutions for the three brief research questions:

- (1). Precisely, the Individual Social Feature (ISF) of “Social-media Connection of Global Literacy Abilities” is directly and effectively advanced by Course Evaluation Technology Function (CETF), Course Professionalization Technology Function (CPTF) and Aggregation Technology Function (ATF) of “MOOCs features of organizational supplements” and Course Complete Rate of Course Assessment (CCR-CA), User Completely Unrestricted Operation of Course Operation (UCUO-CO) and Course Professionalization Technology Function of Course Function (CPTF-CF) of “higher education strategies of developed sustainability”. That means the higher education institutions have to not only simultaneously and efficiently institute Course Completion Rates of Course Assessment (CCR-CA), User Completely Unrestricted Operation of Course Operation (UCUO-CO) and Course Professionalization Technology Function of Course Function (CPTF-CF) into the course’s design but also establish MOOCs features of Course Evaluation Technology Function (CETF), Course Professionalization Technology Function (CPTF) and Aggregation Technology Function (ATF) into the current MOOCs in order to effectively promote the Individual Social Feature (ISF) of “Social-media Connection of Global Literacy Abilities” for overcoming the dual impacts of lower birth-rate and COVID-19. In addition, the higher education institutions also have to construct the “Social-media Connection of Global Literacy Abilities” evaluation model for evaluating Individual Social Feature of each MOOCs participant.
- (2). Significantly, the Application Programming Interface (API) of “Social-media Connection of Global Literacy Abilities” is distinctly and obviously facilitated by Convenience of Course Operation (C-CP), Feedback Technology Function of Basic Function (FTF-BF) and Connectionization of Course Operation (C-CO) of “higher education strategies of developed sustainability” and Connectionization (CZ) of “MOOCs features of organizational supplements”. That means the higher education institutions should develop Convenience of Course Operation (C-CP), Feedback Technology Function of Basic Function (FTF-BF) and Connectionization of Course Operation (C-CO) of “higher education strategies of developed sustainability” into the course’s structure but also build Connectionization (CZ) of “MOOCs features of organizational supplements” into the current MOOCs in order to efficiently foster Application Programming Interface (API) of “Social-media Connection of Global Literacy Abilities” for conquering the dual impacts of lower birth-rate and COVID-19 as well.

Particularly, beyond the implementation of this interdisciplinary research, not only some evaluated factors (ex. digital education developed tendency and technological supporting in education) but also some evaluated methodologies (ex. analytical network process (ANP) of qualitative analysis) are further considered as future directions of related studies of Social-media Connection of Global Literacy Abilities, MOOCs features of organization development and higher education development sustainability strategies.

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## Abbreviations

COVID-19	Coronavirus Disease 2019
IT	Internet Technology
GDP	Gross Domestic Product
OECD	Organization for Economic Cooperation and Development
SLT	Social Learning Theory
API	Application Programming Interface
CR	Content Reality
CF	Conversations Feature
DA	Device Accessibility
IF	Identity Feature
ISF	Individual Social Feature
KE	Keyword-search Engine
MDA	Multiple Device Accessibility
SNCC	Social networking Communication Channel
W3	Web 3.0
UCUO	User Completely Unrestricted operation
C	Convenience
CZ	Connectionization
O	Openness
CCR	Course complete Rate
FTF	Feedback Technology Function
CETF	Course Evaluation Technology Function
ATF	Aggregation Technology Function
CPTF	Course Professionalization Technology Function
RTF	Re-purposing Technology Function
ATF-BC	Aggregation Technology Function of Basic Function
CETF-CF	Course Evaluation Technology Function of Course Function
CPTF-CF	Course Professionalization Technology Function of Course Function
FTF-BF	Feedback Technology Function of Basic Function
RET-BF	Re-purposing Technology Function of Basic Function
C-CO	Connectionization of Course Operation
O-CC	Openness of Course Content
C-CP	Convenience of Course Operation
CCR-CA	Course Complete Rate of Course Assessment
UCUO-CO	User Completely Unrestricted Operation of Course Operation
FA	Factor Analysis
TEM	Trigonometrical Entropy Method

## References

1. World Health Organization. *Coronavirus Disease (COVID-19)*; World Health Organization: Geneva, Switzerland, 2020.
2. Thompson, D. What's behind South Korea's COVID-19 exceptionalism? *Atlantic* **2020**, *1*, 1.
3. Geng, Y.; Khamis, R.M. Social Media Usage in Health Communication and Its Implications on Public Health Security: A Case Study of COVID-19 in Zanzibar. *Online J. Commun. Media Technol.* **2021**, *11*, e202101. [[CrossRef](#)]
4. Yoon, B.; Yol, Ö.; Haag, C.; Simpson, A. Critical Global Literacies: A New Instructional Framework in the Global Era. *J. Adolesc. Adult Lit.* **2018**, *62*, 205–214. [[CrossRef](#)]
5. Cervi, L.; Tornero, J.M.P.; Tejedor, S. The Challenge of Teaching Mobile Journalism through MOOCs: A Case Study. *Sustainability* **2020**, *12*, 5307. [[CrossRef](#)]
6. Choudhury, S.; Pattnaik, S. Emerging themes in e-learning: A review from the stakeholders' perspective. *Comput. Educ.* **2020**, *144*, 103657. [[CrossRef](#)]
7. Hew, K.F. Unpacking the strategies of ten highly rated MOOCs: Implications for engaging students in large online courses. *Teach. Coll. Rec.* **2018**, *120*, 69.
8. Jung, Y.; Lee, J. Learning Engagement and Persistence in Massive Open Online Courses (MOOCs). *Comput. Educ.* **2018**, *122*, 9–22. [[CrossRef](#)]

9. Shapiro, H.B.; Lee, C.H.; Wyman Roth, N.E.; Li, K.; Çetinkaya-Rundel, M.; Canelas, D.A. Understanding the massive open online course (MOOC) student experience: An examination of attitudes, motivations, and barriers. *Com. Ed.* **2017**, *110*, 35. [\[CrossRef\]](#)
10. Turvey, K.; Pachler, N. Design principles for fostering pedagogical provenance through research in technology supported learning. *Comput. Educ.* **2020**, *146*, 1. [\[CrossRef\]](#)
11. Kovanović, V.; Joksimović, S.; Poquet, O.; Hennis, T.; Čukić, I.; De Vries, P.; Gašević, D. Exploring communities of inquiry in massive open online courses. *Com. Ed.* **2018**, *119*, 44. [\[CrossRef\]](#)
12. Yoon, B.; Simpson, A.; Haag, C. Assimilation Ideology: Critically Examining Underlying Messages in Multicultural Literature. *J. Adolesc. Adult Lit.* **2010**, *54*, 109–118. [\[CrossRef\]](#)
13. Merryfield, M.M. Why aren't teachers being prepared to teach for diversity, equity, and global interconnectedness? A study of lived experiences in the making of multicultural and global educators. *Teach. Teach. Educ.* **2000**, *16*, 429–443. [\[CrossRef\]](#)
14. Zhao, Y. Preparing Globally Competent Teachers: A New Imperative for Teacher Education. *J. Teach. Educ.* **2010**, *61*, 422–431. [\[CrossRef\]](#)
15. Greene, J.A.; Yu, S.B.; Copeland, D.Z. Measuring critical components of digital literacy and their relationships with learning. *Comput. Educ.* **2014**, *76*, 55–69. [\[CrossRef\]](#)
16. Gutiérrez-Santiuste, E.; Gámiz-Sánchez, V.M.; Gutiérrez-Pérez, J. MOOC & B-learning: Students' barriers and satisfaction in formal and non-formal learning environments. *J. Interact. Online Learn.* **2015**, *13*, 88.
17. Kitchen, J.A.; Hallett, R.E.; Perez, R.J.; Rivera, G.J. Advancing the Use of Ecological Systems Theory in College Student Research: The Ecological Systems Interview Tool. *J. Coll. Stud. Dev.* **2019**, *60*, 381–400. [\[CrossRef\]](#)
18. Garrison, D.; Cleveland-Innes, M.; Fung, T.S. Exploring causal relationships among teaching, cognitive and social presence: Student perceptions of the community of inquiry framework. *Internet High. Educ.* **2010**, *13*, 31–36. [\[CrossRef\]](#)
19. Laura, C.; Núria, S.; Santiago, T.C. Analysis of Journalism and Communication Studies in Europe's Top Ranked Universities: Competencies, Aims and Courses. *J. Pract.* **2020**. [\[CrossRef\]](#)
20. Cochran, J.K.; Maskaly, J.; Shayne, J.; Christine, S.S. Using Structural Equations to Model Akers' Social Learning Theory with Data on Intimate Partner Violence. *Crime Delinq.* **2017**, *63*, 39. [\[CrossRef\]](#)
21. Hsieh, M.-Y. Online Learning Era: Exploring the Most Decisive Determinants of MOOCs in Taiwanese Higher Education. *Eurasia J. Math. Sci. Technol. Educ.* **2016**, *12*, 1163. [\[CrossRef\]](#)
22. Kruis, N.E.; Chunghyeon, S.; Bitna, K. Revisiting the Empirical Status of Social Learning Theory on Substance Use: A Systematic Review and Meta-Analysis. *Subst. Use Misuse* **2020**, *55*, 666. [\[CrossRef\]](#) [\[PubMed\]](#)
23. Hsieh, M.-Y.; Usak, M. High Education Radical Transformation Era: How Teachers' Competency can enhance the Students' Employability? *Rev. Cercet. Interv. Soc.* **2020**, *68*, 95–112. [\[CrossRef\]](#)
24. Huang, Y.-M.; Hsieh, M.-Y. An Interdisciplinary Research on Students' Employability in Technology Education to Advance Higher Education Enrollment Sustainability. *Sustainability* **2020**, *12*, 1806. [\[CrossRef\]](#)
25. Maydeu-Olivares, A.; Fairchild, A.J.; Hall, A.G. Goodness of Fit in Item Factor Analysis: Effect of the Number of Response Alternatives. *Struct. Eq. Model. A Multidiscip. J.* **2017**, *24*, 495–505. [\[CrossRef\]](#)
26. Santos, R.D.O.; Gorgulho, B.M.; De Castro, M.A.; Fisberg, R.M.; Marchioni, D.M.; Baltar, V.T. Principal Component Analysis and Factor Analysis: differences and similarities in Nutritional Epidemiology application. *Rev. Bras. Epidemiol.* **2019**, *22*, e190041. [\[CrossRef\]](#)
27. Jiahang, S.; Jun, W.; Side, H. Identification of unknown spent nuclear fuel with factor analysis for nuclear forensic purpose. *Ann. Nucl. Energy* **2019**, *126*, 43.
28. Hsieh, M.-Y. Interdisciplinarily Exploring the Most Potential IoT Technology Determinants in the Omnichannel E-Commerce Purchasing Decision-Making Processes. *Appl. Sci.* **2020**, *10*, 603. [\[CrossRef\]](#)
29. Hsieh, M.Y. SoLoMo Technology: Exploring the Most Critical Determinants of SoLoMo Technology in the Contemporary Mobile Communication Technology Era. *J. of Am. In. and Hum. Com.* **2018**, *9*, 307–318. [\[CrossRef\]](#)
30. Huang, Y.-M.; Hsieh, M.Y.; Usak, M. A Multi-Criteria Study of Decision-Making Proficiency in Student's Employability for Multidisciplinary Curriculums. *Mathematics* **2020**, *8*, 897. [\[CrossRef\]](#)
31. Hsieh, M.-Y. The most potential principles of social media. *Comput. Electr. Eng.* **2016**, *51*, 376–388. [\[CrossRef\]](#)
32. Hsieh, M.Y. Employing MCDM methodology to verify correlation between social media and service quality in the dynamic m-commerce era. *J. In. Tech.* **2018**, *19*, 225–239. [\[CrossRef\]](#)
33. Hsieh, M.Y. The Most Sustainable Niche Principles of Social Media Education in a Higher Education Contracting Era. *Sustainability* **2020**, *12*, 399. [\[CrossRef\]](#)
34. Dalkey, N.; Helmer, O. An Experimental Application of the DELPHI Method to the Use of Experts. *Manag. Sci.* **1963**, *9*, 458–467. [\[CrossRef\]](#)