Teaching Digital Game Curricula in the Communication Discipline in Higher Education Institutions in the Greater China Region: A Curriculum Analysis Approach

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ABSTRACT
Digital game revenue in Asia is predicted to reach USD$20 billion, about 38% of the world market. As a result, higher education institutes in this region have enthusiastically developed programs to educate future digital game professionals. However, how have communication-related programs responded to the challenges and opportunities of digital game industries remains to be studied? In this study, we collected curricular data from 62 communication-related programs in China, Hong-Kong, Macau, Singapore, and Taiwan and provided the following observations: 1) The majority of communication-related programs in the Greater China Region has not offered comprehensive digital game curricula; 2) Newly-established programs are more responsive to the challenges and opportunities of digital game industries; 3) Courses in digital games are limited in scope and mainly concentrated on technology- and content-production dimension; 4) there is an observable relationship between faculty academic training, program direction, and course contents. Pedagogical implications were also discussed.

Keywords
Communication Curriculum, Communication Discipline, Creative Industries, Curriculum Analysis, Digital Games, the Greater China Region

INTRODUCTION
According to PricewaterhouseCoopers LLP (2015a), it is estimated that global digital games revenue will grow steadily through to 2019 and reach US$93.18 billion by 2019. Recent developments in cloud gaming technologies and applications will enhance the connectivity of global mobile devices (such as smartphones) to $3.85 billion by 2019 (PricewaterhouseCoopers LLP 2015b). Latest data released by the Entertainment Software Association (henceforth, ESA) in its report, *Video Games in the 21st Century:*

Proceedings of Chinese DiGRA 2016

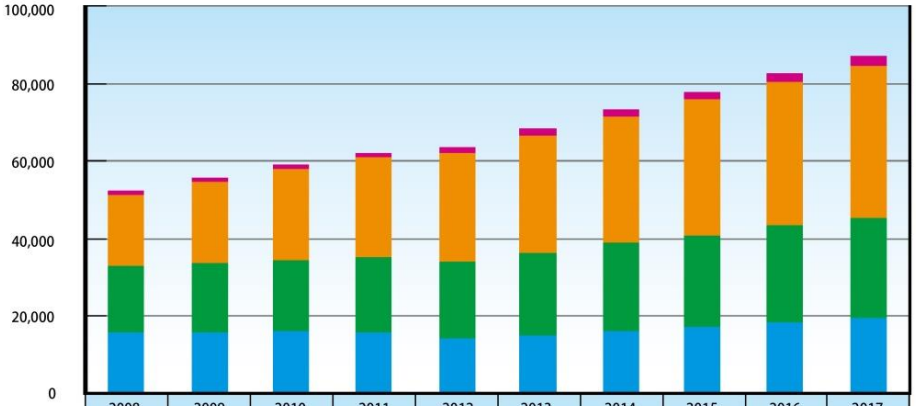
The 2014 Report, states that, in 2013 alone, the retail sales of digital games in the U.S. have reached $15.4 billion (Siwek 2014). The digital game industry has also added $6.2 billion to the U.S. Gross Domestic Product (GDP) (Siwek 2014). Digital game revenues in Asia are expected to reach about $20 billion in 2015 (equivalent of 38% of the world market) and $21 billion in 2016 (SuperData Research 2015). An eight percent annual growth in the digital game industry has been forecasted in 2016 (SuperData Research 2015).

The global digital game market is expected to generate $99.6 billion and $46.6 billion comes from Asia-Pacific countries (Newzoo 2016). By the end of 2015, digital game market in Asia has reached 20 billion (North 2015). China's digital game market grew 5 times as the rest of Asia (North 2015). China accounted for 38% of digital game market in Asia, equivalent of $7.5 billion (North 2015). The market has reached 14,427.5 million in 2016 and is expected to grow at 6.42% annually (The Statistics Portal 2016). In spite of China's size of population, Japan is the largest digital game market in Asia (45%, or $8.8 billion users), with its annual growth being16% higher than that of China (North 2015; SuperData Research 2015). In Singapore, revenue from the digital game segment is about $247.7 million and is expected to grow at 11.11% annually (The Statistics Portal 2016). In Hong-Kong, the digital game market has reached $285.9 million in 2016 and will grow at 5.62% each year (The Statistics Portal 2016).

Recent data on global digital game market have also shown that its market sales have grown to $6.2 billion in February 2016 (SuperData Research 2016). The global diffusion of various digital gaming platforms has led to the rapid growth of gamer populations around the world (Soper 2014). According to a recent industry report by *Gpil Gamers*, there are 1.2 billion gamers around the world (Soper 2014). In the U.S., almost half of its population plays video games (Entertainment Software Association 2015). For example, in the U.S., female gamers have made up 48% of the gaming population (Grungberg and Hansegard 2014). Around 711 million gamers use personal computer to play games (James 2014). In the Asia-Pacific region, it is reported to have the largest number of players (PRNewswire 2014). Different countries and entities in the Great China region have demonstrated various penetration rates. For example, in China, the current penetration rate is 35.08% in 2016 and will grow to 39.26% in 2020, while in Hong-Kong, 35.59% of the population play digital games in 2016 and the rate will grow to 64.18% in 2020 (The Statistics Portal 2016). In Singapore, the 2016 penetration rate is 46.73% while it is expected to reach 54.54% in 2020 (The Statistics Portal 2016). A data published by Nielsen (cited in Yahoo 2015) found that, in Taiwan, there were about 7.6 million digital game players in the first quarter of 2015. There were 4.6 million players (20%) who use online and mobile devices (Nielsen 2015 cited in Yahoo 2015).

Digital game industries around the world have demonstrated very robust growth (PricewaterhouseCoopers LLP, cited in Bureau of Industrial Development 2013). In 2008, its size is merely USD$52 billion, but continues to demonstrate its upward trends: USD $55.42 billion (in 2009), USD $61.29 billion (in 2010), USD $62.19 billion (in 2011), USD$63.44 billion (in 2012), USD$68.13 billion (in 2013), and USD$73.32 billion (in 2014) (PricewaterhouseCoopers LLP, cited in Bureau of Industrial Development 2013). The sector is expected to reach USD$77.93 billion (in 2015), USD $82.61 billion (in 2016), and USD$80.98 billion in (in 2017) (PricewaterhouseCoopers LLP, cited in Bureau of Industrial Development 2013). The Asia-Pacific region is forecasted to grow at almost 200%, when compared the statistics between 2008 and 2017 (See Figure 1 below). For example, in Taiwan, the total digital game industry had grown to $45.32 billion NTD

(about $1.462 billion USD) in 2013 from $40.7 billion NTD (about USD $1.313 billion) in 2012 (about USD $1 billion) (Industrial Development Bureau 2013) (Refer to Figure 2).



	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Total	52,135	55,421	59,074	62,192	63,438	68,125	73,316	77,933	82,614	86,977
Latin America Region	965	1,012	1,128	1,299	1,469	1,653	1,841	2,028	2,229	2,452
Asia-Pacific Region	18,441	20,998	23,533	25,588	27,877	30,232	32,655	34,935	37,242	39,537
Europe, Mid-East, and Africa Regions	16,666	17,383	18,092	19,023	19,552	20,876	22,219	23,360	24,436	25,400
North America Region	16,063	16,028	16,321	16,282	14,540	15,364	16,600	17,611	18,708	19,588

Figure 1: The Size of Digital Game Industries around the World (in US million dollars, %)
Source: Bureau of Industrial Development (2013)

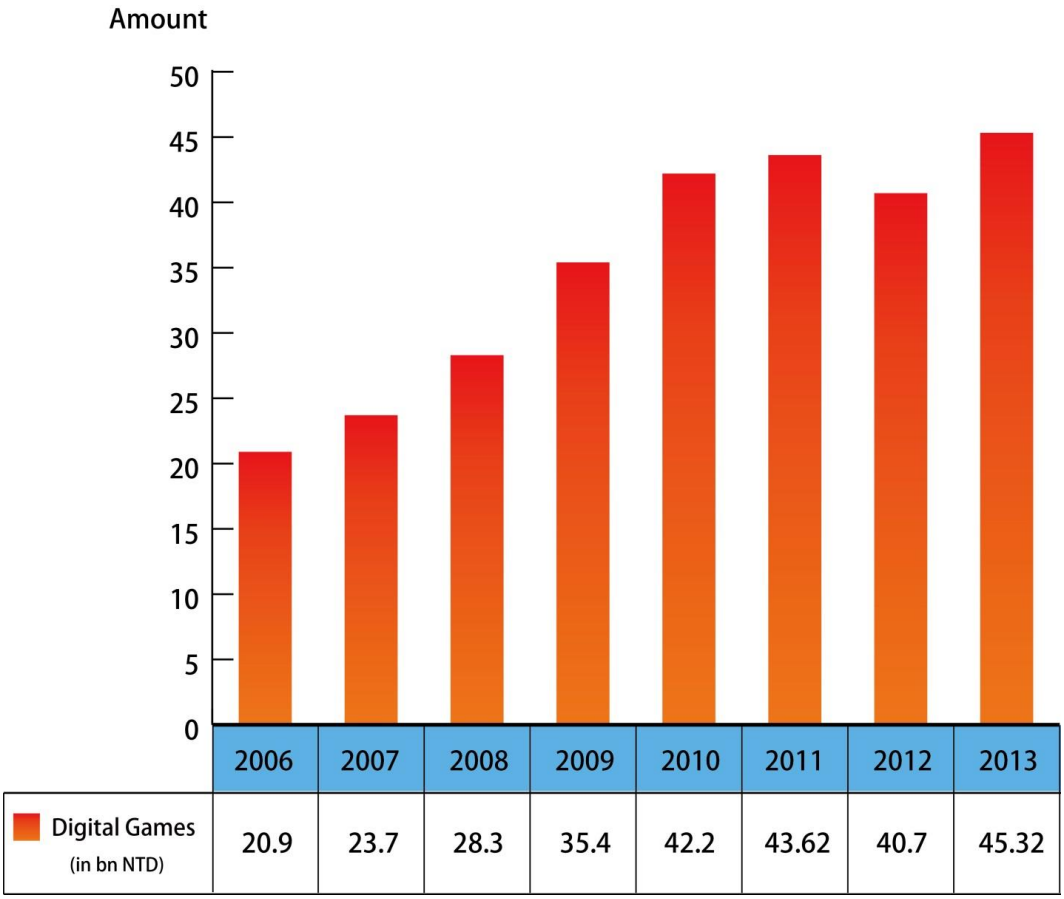


Figure 2: The Size of Digital Game Industries in Taiwan.
Source: Industrial Development Bureau (2013)

The digital game market is predicted to grow 1% annual till 2017 in the U.S. (PRNewswire 2014). When compared with the entire U.S. economic growth of 2.4%, the annual growth of the digital game industry is steadily at 9.7% per year (Siwek 2014). Due to the growing importance of this sector, digital game companies in the United States directly employ over 42,000 people in thirty-six states in the U.S. (Siwek 2014). Given the prosperous development of the digital game industry, game-related employment opportunities have grown 9% per year since 2009 (Gaudiosi 2015). Jobs related to the game industry have grown to 42,000 people in 36 states – a 30% growth since 2009 (Gaudiosi 2015).

The growing importance of digital game industries has created a strong demand for workers at various fields of digital games. For example, prompted by the prediction of potential game-related employment to continue to grow, higher education institutes in Taiwan have also rushed to establish programs to meet the industry needs. Other countries in the Greater China Region have also developed new digital game-related programs in colleges and universities. For example, the School of Creative Media at City University of Hong-Kong was established to train digital game professionals.

RESEARCH OBJECTIVES

In this project, we used a curriculum analysis approach to collect curricular data from a total of 61 communication, mass communication, media, and/or journalism departments

among higher education institutions in the Greater China Region that conventionally includes China, Hong-Kong, Macao, Singapore, and Taiwan. This study discusses trends in program assessment and development to better educate future communication students interested in the opportunities that digital games have created in this region. Through a curriculum comparison method that is commonly used by comparative education research in terms of curriculum development, assessment, and accreditation (Adamson and Mason 2007), the authors discuss trends in program assessment and development to better educate future digital game industry professionals.

LITERATURE REVIEW AND RESEARCH QUESTIONS

According to the Commission on Colleges of the Southern Association of Colleges and Schools (2005), the coherence of curriculum is "a critical component of a program and should demonstrate an appropriate sequencing of courses, not a mere bundling of credits, so that student learning is progressively more advanced in terms of assignments and scholarship required and demonstrates progressive advancement in a field of study that allows students to integrate knowledge and grow in critical skills" (12). One of the popular curriculum and program assessment methods is called the curriculum mapping method (Veltri, Webb, Matveev, and Zapatero, n.d.). On the basis of the procedures proposed by Veltri et al. (n.d.), there are six steps in assessing a university curriculum: 1) intended curriculum; 2) designed curriculum 3) communicated curriculum; 4) enacted curriculum; 5) assess curriculum; 6) key quantitative indices. This type of thorough curriculum alignment and comparison with learning outcomes has provided detailed analysis of existing curriculum for future program redesign and improvement (Veltri et al., n.d.).

According to Koppang (2004), curriculum mapping method aims to collect data to describe what is taught in schools. In recent years, this method has been used as "a tool for improving communication among teachers about the content, skills, and assessments that are a part of the instructional process" (Koppang 2004, 155). The purposes of the curriculum mapping method are as follows: 1) to line up instruction to the written criteria; 2) to develop unified curriculum units; 3) to provide a baseline for the curriculum review and renewal process; 4) to identify development needs of the staff; 5) to offer communication among teaching staff (Koppang 2004).

A thorough overview of the integration of digital game courses into existing communication-related programs to train future digital game professionals will enable educators to better assess the rationale to develop new digital game programs in the Greater China Region. The authors discuss trends in program assessment and development to better educate future digital game talents. This project also aims to provide cross-country/-location data to examine the impacts of digital games on higher education systems in this region. Specifically, this project aims to answer the following three research questions:

Research Question 1: What is the current state of digital game industries in the Greater China Region?
Research Question 2: What is the current state of digital game curricula in communication, mass communication, media, and/or journalism programs and departments in the Greater China Region?
Research Question 3: What are the observable location-specific and region-wide trends in integrating digital game courses into existing communication-related programs in the Greater China Region?

RESEARCH METHOD

Higher Education Institutions in the Greater China Region

The authors relied on the website (http://www.4icu.org/) to identify higher education institutions to collect curricular information from about 1,000 colleges and universities from several countries and regions in the Greater China Region.

In China, there are 863 universities and colleges to serve this populous country. These universities include historical universities such as Peking University, Beijing Normal University, Peking Union Medical College, Fudan University, Hunan University, Nankai University, Yunnan University, Zhejiang University. Some are newly-founded and specialized in media and communication fields such as Beijing University of Posts and Telecommunications, Zhejiang University of Media and Communications, Communication University of China. Due to the size of the higher education institutions in China, we relied on the website, "中國的大學各科系排名" (i.e., "Rankings of Chinese Universities") (http://www.urwinner.net/China/major/bmajor.htm), and its sub-category, "新聞傳播學類" (i.e., "Journalism and Communication Disciplines") (http://www.nseac.com/html/260/645953.html), to select top 20 universities in this category. In our sample, we have included Remin University of China (#1), Fudan University (#2), Communication University of China (#3), Wuhan University (#4), Huazhong University of Science and Technology (#5), Shandong University (#6), Xiamen University (#7), Zhejiang University (#8), Jinan University (#9), Sichuan University (#10), etc. These top universities in China have often offered a wide spectrum of degrees from bachelor's, master's to doctoral curricula.

There are eight colleges and universities in Macau including Universidade de Macau, Macau University of Science and Technology, Instituto de Formação Turística, Instituto Politécnico de Macau, Kiang Wu Nursing College of Macau, Macau Millennium College, University of Saint Joseph, and Macau Institute of Management. Among these colleges and universities, three of them have communication-related programs: Universidade de Macau (B.A. program in communication), Macau University of Science and Technology (B.A. and Ph.D. programs in communication), and University of Saint Joseph (B.A. program in communication and media) (Refer to Table 1).

Countries or Region in the Greater China	Total Number of Higher Education Institutions	Communication-Related Schools or Colleges	Bachelor's Degree	Master's Degree	Doctoral Degree
China	863	20	70	59	29
Digital Game-Related			1	1	1
Hong-Kong	11	5	5	5	3
Digital Game-Related			2	2	1
Macau	5	3	3	3	1
Digital Game-Related			0	0	0

Singapore	5	2	2	2	2
Digital Game-Related			1	1	1
Taiwan	111	32	55	38	4
Digital Game-Related			14	2	0

Table 1: Communication-Related Programs Offering Digital Game-Related Courses in the Greater China Region

There are eleven universities and colleges in Hong-Kong which includes the followings: The University of Hong Kong, The Chinese University of Hong Kong, The Hong Kong University of Science and Technology, The Hong Kong Polytechnic University, City University of Hong Kong, Hong Kong Baptist University, The Hong Kong Institute of Education, The Open University of Hong Kong, Lingnan University, Hong Kong Shue Yan University, and Chu Hai College of Higher Education. Among these colleges and universities, five of them have communication-related programs: University of Hong-Kong (B.A., M.A., and Ph.D. in journalism and media studies), City University of Hong-Kong (B.A., M.A., and Ph.D. in media and communication), The Chinese University of Hong Kong (B.A., M.A., and Ph.D. in School of Journalism and Communication), The Hong Kong Baptist University (B.A., M.A., and Ph.D. in communication), and The Hong Kong University of Science and Technology (in multimedia) (Refer to Table 1).

In Singapore, there are five colleges and universities such as National University of Singapore, Nanyang Technological University, Singapore Management University, SIM University, and Singapore University of Technology and Design. Among them, two colleges and universities offer communication-related programs: National University of Singapore (B.A., M.A., and Ph.D. in communication and new media) and Nanyang Technological University (B.A., M.A., and Ph.D. in its School of Communication and Information) (Refer to Table 1).

There are 111 colleges and universities in Taiwan, including National Taiwan University, National Chiao Tung University, National Chengchi University, Tamkang University, National Sun Yat-Sen University, National Taiwan Normal University, Fu Jen Catholic University, Shih Hsin University, Chinese Culture University, National Chung Cheng University, Ming Chuan University, Yuan Ze University, I-Shou University, National Dong Hwa University, etc. A total of 32 institutes have established communication-related programs that offer B.A., M.A., or Ph.D. programs (Refer to Table 1).

FINDINGS AND DISCUSSION

Country/Location-Specific Analysis

China

Among 20 universities selected from the top communication and journalism programs in China, there are 70 undergraduate, 59 M.A., and 29 doctoral programs that offer communication-related specializations (such as advertising, broadcasting, journalism, and communication). In the analysis of the curricular data, the authors only found The School of Animation and Digital Arts in the Communication University of China that offers digital game concentration at B.A., M.A., and doctoral levels. The Department of Game

Design offers two areas of specializations in both Game Programming and Game Art. Its M.A. program also offers training in game design. Other universities that were analyzed focus on traditional communication-related courses in advertising, journalism, media or communication.

Hong-Kong, SAR

After the analysis of curricular data among four colleges and universities that offer communication-related programs, it is observed that the majority of communication-related programs continue to offer traditional communication programs. For example, the School of Communication at the Hong-Kong Baptist University offers three areas of communication studies: Film and Media Arts, Journalism, Organizational Communication, and Public Relations and Advertising. There are no digital game-related courses in its undergraduate and graduate programs. However, new academic units have been established to take advantage of the opportunities and challenges of digital games. For example, City University of Hong-Kong's (CUHK) School of Creative Media has offered most comprehensive digital game-related courses in its undergraduate and graduate programs (Master of Philosophy and Doctor of Philosophy in Creative Media). As shown in the following curriculum, in its 93-credit-hour Bachelor of Arts and Science in New Media, digital game-related courses are offered in Group 2 (Art of Games and Play) (See Table 2). The Hong Kong Polytechnic University (i.e., PolyU) has a multimedia program in both M.A. and B.A. programs.

Course Code	Course Title	Credit Units
SM2259	Game and Play Studies	3
SM2260	Interactive Narrative	3
SM2263	Hacktivism and Tactical Media	3
SM2603	2D Game Production	3
SM3120	Game Level Design	3
SM3601	Game Prototyping and Design	3
SM3608	3D Game Production	3
SM3609	Production Process for Animation, Games and Installation	3
SM3702	Pervasive Media: Culture, Value, and Practice	3
SM3707	Ethnography in Games and Virtual Environments	3
SM3712	Computer Game Criticism	3
SM3714	Special Topics in Art of Game and Play	3
SM4704	Art Game Workshop	3

Table 2: Digital Game-Related Courses at CUHK (Group 2: Art of Games and Play)

Macau, SAR

Three communication-related programs in Macau offer mainly conventional communication curricula by focusing on journalism, mass communication, and advertising.

Singapore

Among five higher education institutions in Singapore, the Department of Communications and New Media at the National University of Singapore has offered the most comprehensive digital game-related courses at its undergraduate curriculum. In addition to its core courses in basic communication theories and research methods,

students can choose communication management, interactive media design, and media studies tracks. Digital game-related courses are included in the interactive media design track and include courses such as (See Table 3).

Communication Management	Interactive Media Design	Media Studies
NM2201 Intercultural Communication	NM2212 Visual Design	NM2101 Theories of Communications and New Media
NM2203 Social Media in Communication Management	NM2213 Introduction to Human-Computer Interaction Design	NM2209 Social Psychology of New Media
NM2219 Principles of Communication Management	NM2216 User Centred Design Methodologies	NM2301 Persuasive Communication: Theory and Application
NM2220 Introduction to Media Writing	NM3205 Digital Culture and Art	NM2302 Mobility and New Media
NM3211 News Reporting and Editing	NM3209 Designing for Interactivity	NM3202 Governance and New Media
NM3214 New Media and Science Communication	NM3213 Digital Humanities	NM3203 Copyright and New Media
NM3215 Advertising Strategies	NM3216 Game Design	NM3204 E-Learning
NM3217 Design for Strategic Communications	NM3221 Mobile Interaction Design	NM3207 Philosophy in Communications and New Media
NM3219 Writing for Communication Management	NM3222 Interactive Storytelling	NM3210 Cybercrime and Society
NM3232 Strategic Communication: Concepts	NM3223 Digital and Interactive Collage	NM3224 Culture Industries
NM3233 Strategic Communication: Applications	NM3225 Critical Approaches to Interactive Media	NM4102 Advanced Communications & New Media Research
NM3234 Leadership, Organisations and New Media	NM3226 Location-Based Interactive Experiences	NM4202 Transnational Information Producers
NM3235 Corporate Social Responsibility: Research and Practice	NM3227 Critical Game Design	NM4203 Infocomm Technology Policy
NM3236 Ethics in Communication Management	NM3228 Interactive Sequential Art	NM4204 Ethical Issues in Emergent Technologies
NM3237 Health Communication	NM3229 Data Visualization	NM4206 Media and Communications Regulation
NM3880 Topics in Communication Management	NM3230 Photographic and Video Storytelling	NM4212 Media and Representation

NM4206 Media and Communications Regulation	NM3231 Physical Interaction Design	NM4213 Digital Economies
NM4207 Managing Communication Campaigns	NM3238 Software Studies	NM4218 Knowledge Mgmt: Approaches & Critique
NM4208 Designing for an Integrated Communications Environment	NM4209 Advanced Game Design	NM4223 New Media and Organizations
NM4211 Online Journalism	NM4210 User Experience Design	NM4229 Cultural Communication and Creative Expression
NM4217 Advanced Communication Campaigns	NM4224 Sound and Interaction	NM4881A Topics in Media Studies: Social Media
NM4219 New Media in Health Communication	NM4225 Design Fiction	NM4883B Ethnomethodology for New Media
NM4221 Writing for Health Communication and New Media	NM4226 Interactive Media Design Capstone Project	NM5201 State and Civil Society in the Information Age
NM4228 Crisis Communication	NM4227 Playable Art	NM5204 Computer-Mediated Environment
NM4883 Topics in Communication Management	NM4230 Communication for Social Change	NM5205 Cognition and Media
NM4883C Communication and Asian Holistic Healthcare	NM4882A Special Topics: Playable Worlds	NM5207 ICTs and Development
NM5212 Theories Of Public Relations	NM5206 Emerging Media Interaction Design	NM5881 Topics in Media Studies
NM5216 Culture, Communication & Health	NM5209 Interactive Media Arts	
NM5883 Topics in Communciation Management	NM5210 Interactive Media Design Research	
	NM5211 Serious Games & Learning Media	
	NM5214 Design for Open Science	
	NM5215 Design Knowledge for Interactive Media	
	NM5217 Designing for Prosocial Behavior	
	NM5882 Topics in Interactive Media Design	

Table 3: Digital Game-Related Curriculum at the National University of Singapore

The well-established Wee Kim Wee School of Communication and Information, mainly offer traditional communication curricula.

Taiwan

After analyzing these 32 communication-related programs, digital game courses are only offered in the following programs and in a sporadic manner: “Digital Game and Society” (Department of Communication & Technology, National Chiao-Tung University), “Digital Game Planning and Design, National Cheng-Chi University), “Digital Game Design” and “Digital Game Design and Community” (Degree Plan in Creative Industries and Digital Film, Kainan University), “Digital Game Design” and “Digital Game and Technology” (Department of Information Communication, Kainan University), “Digital Game Planning,” “Digital Game Production,” “Digital Game Special Project” (Department of Computer-Aided Media Design, Chang-Jung University), “Game Design” and “Advanced Game Design” (Department of Information Communication, Mingdao University), “Digital Game Production” (Department of Applied Information and Multimedia, Ching-Kuo Institute of Management and Health), “Computer Game Design” (Department of Media Arts, Kang-Ning University), “Digital Game Project” and “Digital Game Project” (Department of Information and Communication, Yuan-Ze University). In general, digital game-related courses are offered at junior and senior levels as electives in the undergraduate programs. The Department of Information Communication at Yuan-Ze University offers a sequence of digital game content production courses at its M.A. program. It was concluded that there is a lack of fully-development digital game curricula in the communication-related program in Taiwan (Refer to Figure 3 and Figure 4).

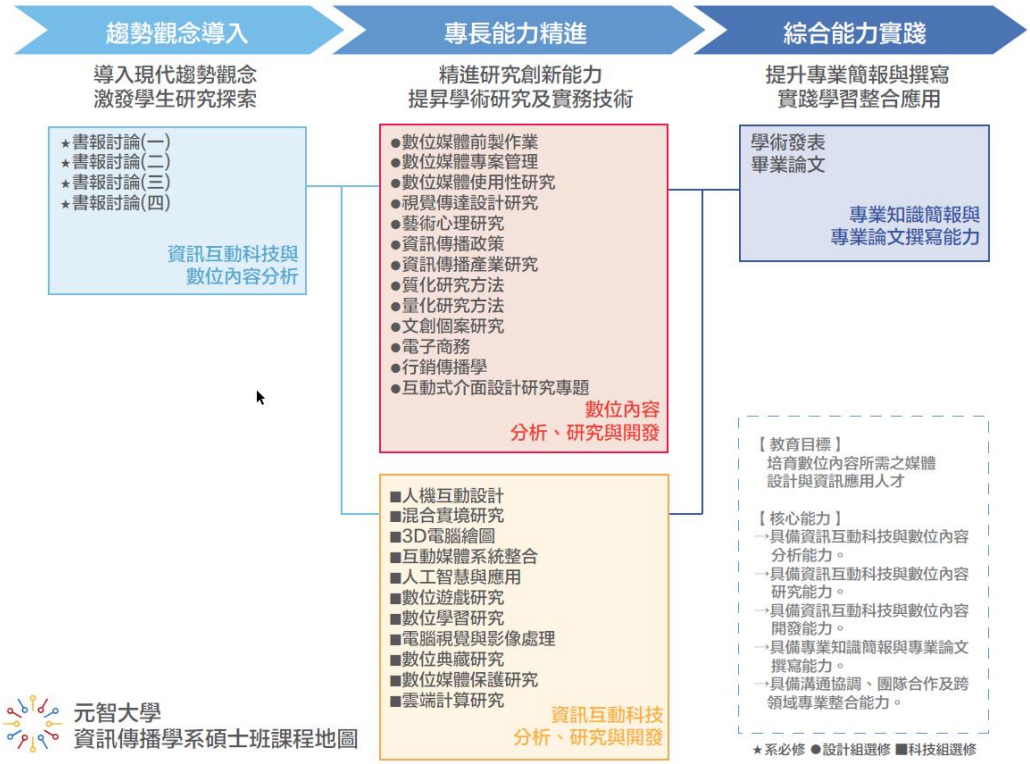


Figure 3: The Undergraduate Curriculum Map at Yuan-Ze University

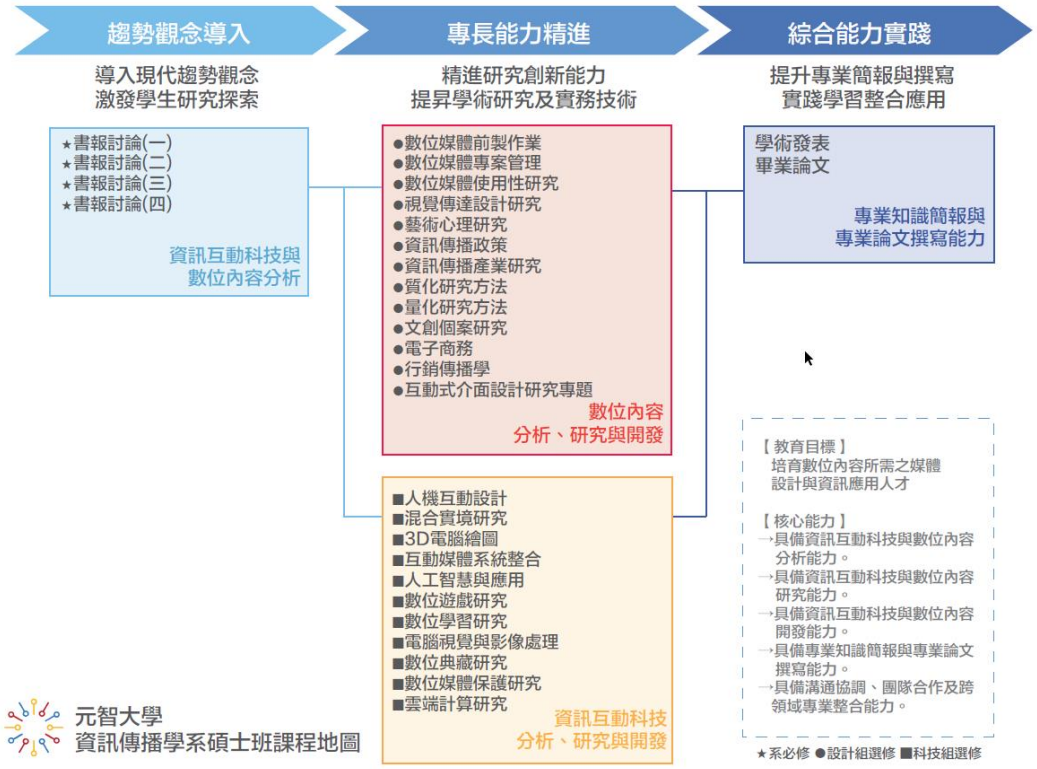


Figure 4: The Graduate Curriculum Map at Yuan-Ze University

Region-Wide Observations in the Greater China Region

The aggregate data reported above demonstrate the overall trends of how communication-related programs in the Greater China Region have not fully responded to the opportunities and challenges of the emerging digital game industry. To better understand the noticeable characteristics of how communication-related programs have integrated digital game curricula into their existing programs in this region, the authors provide the following observations after assessing curricular structures, content areas, and organization of communication-related programs from higher education institutions in the Greater China Region:

Region-Wide Observation #1:
It is noticeable that traditional communication-related programs in the Greater China Region have not offered a comprehensive curriculum in digital game courses. A limited number of digital game-related (mainly technical) courses has been offered on the basis of faculty interests.

Region-Wide Observation #2
Compared with more established communication-related programs in the Greater China Region, new colleges and universities are observed to be more responsive to the rise of digital game industries and offer more innovative courses to train future digital game talents.

Region-Wide Observation #3

After analyzing curriculum maps, course contents, and structure, it is observed that the pedagogical emphasis is placed on training students to learn how to produce digital game contents. A list of technology- and programming-based courses are offered in these digital game-related curricula. This tilt has failed to train students to become fully knowledgeable of other aspects of digital games: such as consumer/player research, social implications, game rhetoric, etc. (Refer to Figure 5).

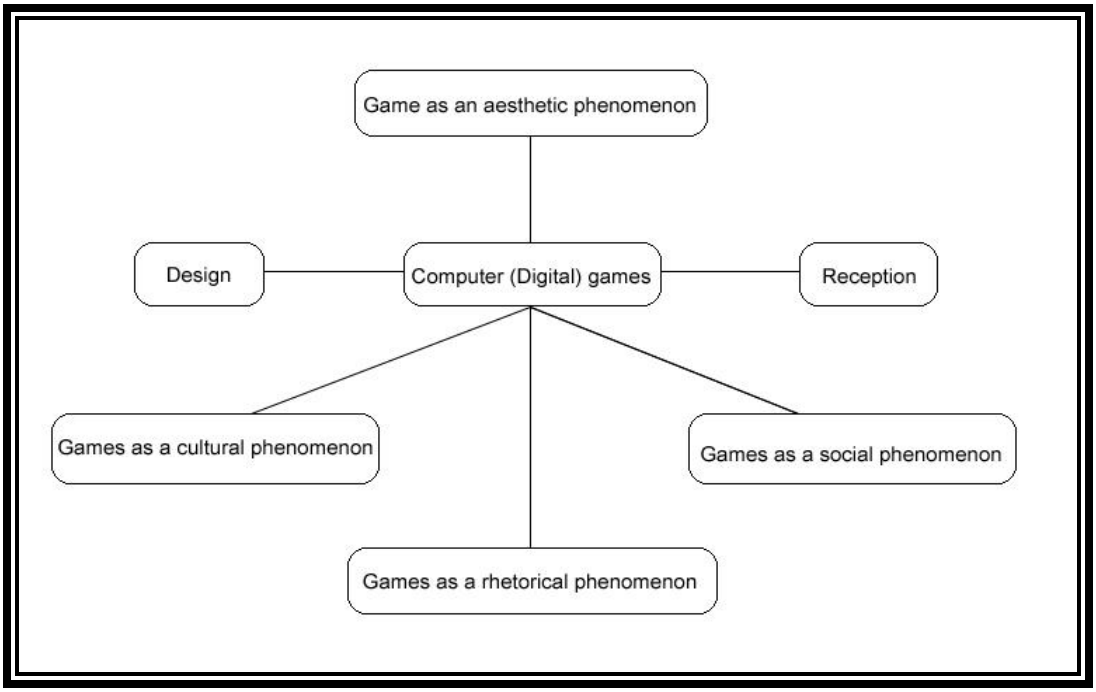


Figure 5: Dimensions of Digital Game Studies (Modified from Raessens, Joost, and Jeffrey Goldstein. "Introduction." *Handbook of Computer Game Studies*. Eds. Joost Raessens and Jeffrey Goldstein. Cambridge, M.A.: The MIT Press, 2005. xi-xvii.)

Region-Wide Observation #4
There is an observable relationship between faculty academic training, program direction, and course contents.

CONCLUSION

The fundamental element in educating future digital game industry professionals lies in whether university students learn how to become creative and innovative in order to succeed in this very competitive industry. This study employed a cross-national curriculum analysis approach to collect curricular data from countries and entities in the Great China Region. Implications for this study were discussed below:

Digital Game Industry as Creative Industries

Creativity, as a concept closely related to creative industries, has been studied extensively among many academicians (Ma 2014). Among many theories of creativity, Stenberg's (2006) "investment theory of creativity" has successfully tied creative abilities with decision to promote creative practices. Stenberg (2006) posits that the transformation of creative ideas into products is based on three

individual abilities: synthetic ability, analytical ability, and practical ability. Educational institutes are most likely to be the place where these abilities can be conveyed to students.

Richard Florida's 2002 book, *The Rise of the Creative Class*, posited his seminal idea on the relationship between creativity and economy. His premise emphasizes the contribution of knowledge and idea of "creative class" to the productivity of the economy (Florida 2002; Wilson 2010). Heinze and Hoose (2013) further claim that creative industries are considered as "an integral part of the economy" (p. 517) and "an essential element of modern economic infrastructure" (s516). The growing importance placed upon creative industries as a critical economic sector around the world has prompted higher education institutions to take a pro-active measure to prepare students with potential career opportunities in the emerging sector. For example, Ko and Lau (2014) studied the benefits of including creativity training in educational institutes in Hong-Kong. As noted by Heinze and Hoose (2013), jobs in the creative industries often require a large degree of independence, thus higher education institutions need to adapt these new needs in training future creative talents. Furthermore, the globalization of digital game industries has been found to create outsourcing and market opportunities outside the country. For example, the burgeoning digital game industry has attracted clients and markets in Europe, North America, Japan, and other Asian countries (Kerr 2006).

In conclusion, situating digital game industries with the over-arching creative industry spectrum allows scholars and educational policy-makers to generate important insights into how to assess and improve existing digital game curricula by taking into account multiple complex factors in the process. According to UK government's Department for Culture, Media and Sport (DCMS) (1998), video and computer games have been categorized as one important component of the creative industries (See Figure 6). Its importance will have economic implications as echoed in the assessment of creative industries. Employing Geographical Information System (GIS) to analyze creative clusters in Shanghai, He and Gebhardt (2013) found that creative industries are closely related to urban spaces, which has ramifications for policy-makers to reconsider the importance of digital games and other creative industry sectors for their contribution to the nation's overall economy.

DCMS Model	Concentric Circles Model	Symbolic Texts Model	WIPO Copyright Model
Advertising Architecture Arts and antiques Crafts Design Fashion Film and video Music Performing arts Publishing Software TV and radio Video and computer games	Core Creative Arts • Literature • Music • Performing arts • Visual arts Other Core Cultural Industries • Film • Museums and libraries Wider Cultural Industries • Heritage services • Publishing • Sound recording • TV and radio • Video and computer games Related Industries • Advertising • Design • Fashion	Core Cultural Industries • Advertising • Film • Internet • Music • Publishing • TV and radio • Video and computer games Peripheral Cultural Industries • Creative arts Borderline Cultural Industries • Consumer electronics • Fashion • Software • Sport	Core Copyright Industries • Advertising • Film and video • Music • Performing arts • Publishing • Software • TV and radio • Visual and graphic arts Interdependent Copyright Industries • Blank recording material • Consumer electronics • Musical instruments • Photocopying and photographic equipment Partial Copyright Industries • Architecture • Clothing and footwear • Design • Fashion • Household goods • Toys

Figure 6: Digital Games as a Component of Creative Industries
Source: http://wiley-vch.e-bookshelf.de/products/reading-epub/product-id/3967943/title/Global%2BCreative%2BIndustries.html?autr=%22Terry+Flew%22

Pedagogical Implications

Given the importance of the growing digital game industries around the world, what should higher education institutions in general and communication-related programs in particular do to respond to the challenges and opportunities? First, it is apparent that a competent digital game professional needs to be trained using a multi-disciplinary approach. Therefore, a balanced mix of arts, technology, and design in the curriculum is needed. Secondly, the global nature of global digital game industries requires talents who are cross-disciplinary and –national to better address the needs of cross-national players. For example, the exposure to cross-national and –disciplinary training is essential for the success of these future digital game professionals. Third, the ability to integrate multiple subjects,

disciplines, and cultures will help ensure that students will succeed in the very competitive digital game industry. Fourthly, countries and entities in the Greater China Region have traditionally excelled in the manufacture sectors; digital game industries may offer an alternative path of economic potential when many of these countries are reconsidering their future sustainable economic growth.

Limitations and Future Directions

The present study only collected curricular data from programs that match the search criteria as defined by the keywords. For communication-related programs in China, the authors only selected the top 20 programs due to its number of programs. Findings should be interpreted with caution and with these limitations taken into consider. Future research should expand the sample size (particularly in China) and might integrate faculty academic backgrounds in the analysis. Furthermore, given the interdisciplinary nature of digital game curricula, future study should expand its search to include programs in computer science, information technology, human-computer interface areas to shade more lights on the development of digital game curricula in this region.

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