科技部補助專題研究計畫成果報告
期末報告

探討大學生數位學習績效之性別差異及研訂適性化學習模式(重點代號 :K02)

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中 華 民 國 107 年 10 月 22 日

中 文 摘 要 ： 科技迅速發展，網路學習已讓全世界的學習資源無國界、零時差，學習者只要想學，即能上至天文、下至地理，還可以團隊學習，甚至和全世界的人一起學。學習的現場正出現一場大革命，網路、社群及數據分析的結合，創造出全新樣貌的學習環境。世界各國大學正投入這場新型態高等教育數位化競賽中，數位學習已然成為促進高等教育科技使用的重要趨勢與挑戰且攸關大學存續之發展。然而自2002年教育部推動數位學習至今，尚未建置大學推動數位學習成效的評估機制。且許多研究指出，性別差異與數位學習和ICT的使用有關。

為了解大學生數位學習成效之性別差異及提供個人化數位學習模式，以提升學生數位學習績效，本研究連結校務研究，運用台灣一所大學99學年第一學期至105學年第一學期於Moodle上開設之50門通識教育遠距課程，總共32班3,510位修課學生之成績與其於數位平台上修課之所有歷程資料、個人背景資料、及其在校表現與課外經驗等，以描述性統計及多變項迴歸分析等，找出性別於數位學習績效上之差異及提升數位學習成效之相關因素。本研究目的及方法非常有運用價值，除提供研究者服務學校決策參考外，將建置研究模組提供各大專校院參考與運用，並可提供教育部做為未來跨校共同研究主題之運用模式。

中 文 關 鍵 詞 ： 數位學習；校務研究；個別化學習；學生學習成效；性別差異

英 文 摘 要 ： For the rapid development of science and technology, internet learning has allowed the world's learning resources without borders, zero-day. Learners as long as want to learn, that is, from astronomy, down to geography, but also team learning and even people around the world to learn. Learning the scene is a big revolution, network, community and data analysis to create a new look and feel of the learning environment. Countries around the world are investing in this new type of digital competition in higher education. Digital learning has become an important trend and challenge to promote the use of science and technology in higher education and the development of university survival. However, since 2002 the Ministry of Education promoted digital learning so far, there is no mechanism for assessing the effectiveness of digital learning in universities.

In order to understand the gender differences in digital learning outcomes and to provide personalized digital learning models to enhance students' digital learning performance, this study links institutional research , using 50 general courses offered by Moodle for the first semester of the Asian University's 99 academic year to the first semester of the 105 academic year, a total of 32 classes of 3,510 students with the results of the course on the digital platform course information, personal background information, and its performance in school and

extra-curricular experience. The descriptive statistics and multivariate regression analysis were used to identify the gender differences in digital learning performance and related factors to enhance students' digital learning outcomes. The purpose and method of this study is very useful, in addition to providing the research result with reference to Asia university decision-making services, we will build the research module to provide reference to all the colleges and universities in Taiwan, and provide the Ministry of Education as a common theme of future cross-school application model.

英文關鍵詞：E-learning; Institutional Research; Individualized learning; Student Learning; Gender difference

Research on Gender Differences in the Digital Learning Performance of University Students

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ABSTRACT

The rapid development of science and technology and the integration of networking, community and data analysis has created a new state of higher education featuring digital learning environments. To understand gender differences in the digital learning performance of university students and give students appropriate and timely assistance, this study examined an university in Taiwan with 1,582 students enrolled in the 2014-2016 academic year. We investigated the differences in 24 variables of student's personal backgrounds, learning outcomes, and records in the digital system. Results showed significant gender differences ($p < 0.05$) in semester average scores, rankings of semester average scores, early warning records, tutoring records and digital course performance. On the whole, females outperformed males in digital courses and overall learning outcomes.

CCS Concepts

Applied computing→Education→E-learning

Keywords

Digital learning, Data analytics, Learning performance, Gender differences

1. INTRODUCTION

In order to meet the needs of each student, the government of Taiwan has created a large number of universities (149), a high enrollment ratio (net rate of 70%), low tuition, and a high student loan rate (about 45-50%). Consequently, higher education in recent years has faced many challenges, including the year-on-year student drop-out/suspension rates, reduction of student quality, high unemployment rates of graduates, and the trend of fewer children, forcing some universities to close (Light up Taiwan, 2016). Higher education is facing the same problems not only in Taiwan but all over the world.

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To enhance the learning performance of a relative who lived in a distant area, Salman Khan uploaded his teaching videos on YouTube, and his relative learned well in this way. Later, his example led the digital learning trend worldwide and established a personalized adaptive learning model. Salman Khan used network technology to build a barrier-free global university so that students with insufficient resources could have opportunities to compete with those who had enough resources (Wang Yiduo translation, 2013). In the project "Stanford 2025", it was pointed that in future universities, students will be able to decide what they want to learn and study at their own pace to complete the various stages of learning, and the advantages of online learning will be able to meet the needs of learners for knowledge and skills (Wang Jia, Weng Mesi & Lu Xufeng, 2016). Bernie Trilling and Charles Fadel noted in their book *21st Century Skills-Learning for Life in Our Times* that education in the 21st century is a personalized, learner-centered process featuring online learning, practice learning, real-time learning, and life-based learning (Bernie Trilling, Charles Fadel, 2016).

The rapid development of science and technology has changed learning patterns. Digital learning is closely related to scholastic motivation and the need for teaching design, and learners can schedule their favorite courses in their own time. The combination of internet, community and data analysis has realized learning analytics technology, and the entire learning process of the learner can be recorded in a digital learning system. It is good for a school to provide personalized counseling and an adaptive learning model. In recent years, universities around the world have set up a number of digital learning courses as the way students autonomously learn online has developed and expanded. Digital learning has become an important trend and presents the challenge of promoting the use of science and technology in higher education.

Gender differences have always been a subject of concern to researchers, and many studies suggest that gender differences play a very important role in IT behaviors. The main reason is that different genders have different approaches to measuring the value and effectiveness of science and technology (Chou, C. and M. Tesai, 2007). Elly Broosu also indicated that more and more cultural and gender differences are found to be related to the use of digital learning and ICT, and that the analysis of gender differences in digital learning should reflect the relative importance of these differences to educators as references in designing courses.

In this study, we drew on data from 1,582 students from an university in Taiwan who attended digital learning courses from 2014 to 2016. We examined 24 variables to investigate the gender

differences in their digital learning outcomes and learning performances in hopes of offering significant findings to educators involved in digital learning design.

2. DIGITAL LEARNING THEORY

Digital learning means the practice of teaching or learning through a variety of electronic media, such as computers, networks, interactive television, and compact discs (Clark & Mayer, 2008). In the digital environment, where computers and information are ubiquitous, learning patterns have undergone great changes. Digital learning is a new field that integrates digital technology and teaching and learning areas in response to changes in learning and instruction (Song Yuting & Liao Kemin, 2011).

The theories that affect the development of current digital learning began in the behavioral school, which focuses on directly changing human behavior to achieve a learning goal. The construction school argued that social interaction could explain learning behavior. The most recent school of thought is the learning cognition school. Learning theories change with the times and have many distinctions. The development of digital learning, the impact of science and technology, and the guidance provided by learning theories are outlined in terms of three learning theories as follows.

2.1 Behavioral School

This school argues that knowledge is independent of the human mind, and that learning is a process of knowledge conversion that is an explicit, observable, measurable and repeatable act that attempts to build the predicted general rule (Zhang Chunxing, 2000).

2.2 Construction School

This school claims that knowledge does not exist objectively but is constructed through the process of socialization into the human mind. Dewey's theory of "learning by doing" suggests that courses should be of interest to the students and student-centered rather than teacher-centered. Education is the process of growth, not the goal (Gao Guangfu, 1984). Vygotsky (1978) proposed the argument of the Zone of Proximal Development (ZPD). He suggested that learners could transfer acquired knowledge to new experiences if they were guided by an interactive context of teacher and peers. In this conversion process, the teacher plays an important function by providing sufficient resources to help learners. It has a great effect on promoting the cognitive development of learners.

2.3 Cognitive School

Cognitive development theory is a major theory in psychology. Many scholars have devoted their time to cognitive development research. Papers have developed a computer microscopic world. Through instruction, learners can establish a concrete environment in the computer microscopic world. The Cognitive and Technical Group of Vanderbilt University (CTGV) proposes anchoring teaching. They consider that learning needs to prevent the rigidity of knowledge and address the nature of situational awareness, and then build knowledge through activities. That team has developed a number of teaching videos to guide students through watching films, asking questions, and solving problems (Chiayi University, 2016).

Yan Chunhuang (2007) pointed out that the above three theories have conceptual similarities and obvious differences. The tactics of behaviorism can be used to teach the truth of the so-called "what", the tactics of constructivism are used to teach the principle of the so-called "why", and the tactics of cognitivism are used to teach procedures and principles, the so-called "how".

To summarize the above literature, digital learning in this study is defined as regular distance courses based on the above-mentioned theories. The student's performance evaluations in this study were based on the student's personal background information (5 items), academic performance criteria (5 items), study input (7 items), and records from the digital system of the digital courses (7 items). In total, 24 empirical data were used to explore gender differences in digital learning performance.

3. RESEARCH DESIGN

3.1 Sample

For this study, 1,582 students who studied a general education digital curriculum at an university in Taiwan from 2014 to 2016 were examined. We divided the curriculum into two types: a Natural Science digital curriculum, and a Humanities and Social Science digital curriculum. The respective student numbers were 695 and 923 (Table 1 and Table 2).

Table 1 Number of students attending the Natural Science Digital Curriculum in the 2014-2016 academic year

Academic Year/Semester Course Title	Life Science Ethics	The Mystery of Life: Aging and Health	Taiwan Infectious Diseases	Course Number	Student Number
2014-1	1	1		2	135
2014-2	1	1		2	119
2015-1	1	1		2	133
2015-2	1	1	1	3	123
2016-1	1	1	1	3	149
Total	5	5	2	12	659

Table 2 Number of students attending the Humanities and Social Science Digital curriculum in 2014-2016 academic year

Academic Year/ Semester Course Title	New learning Trends: Digital Learning	Entertainment Wisdom Property Rights and Law	Taiwan Hand Puppet Show	Food Culture in Taiwan	Love, Gender and Law	Course Number	Student Number
2014-1	1					1	139
2014-2	1					1	122
2015-1	1	1				2	202
2015-2	1		1	1	1	4	219
2016-1	1		1	1	1	4	241
Total	5	1	2	2	2	12	923

3.2 Data Source

In all, 24 empirical data were examined to explore gender differences in digital learning performance. The names and operational definitions of the variables are listed in Table 3.

Table 3 Name and Operational Definition of each variable

Name of variable	Operational Definition
Background	Man=1,Female=2
Gender	Enrollment year
Enrollment year	
College	Affiliated college
Department	Affiliated department
Loan	Loan or not during the school and the average amount
Academic performance	The average score for the semester during the school year
Semester score	Percentile ranking in the class during the school year
Percentile class	Percentile ranking in the department during the school year
Percentile_dept	Number of subjects for which warnings were received during the school year
Warnings	

Counseling	Counseling records showing that 1/2 or 2/3 of course subjects were failed
Study input	Number of times students entered the library during the school year
Library use	Number of books borrowed from the school library during the school year
Books borrowed	Absenteeism during the school year
Absenteeism	Number of leaves during the school year
Leave	Suspension record during the school year
Suspension	Dropout record during the school year
Dropout	Record of working outside during the school year
Work	Total number of teaching materials and videos accessed during the course period
Records of Digital course	Total number of homework assignments handed in during the course period
Materials	Total number of discussions during the course period
Homework	Total number of questions asked during the course period
Discussions	Total number of responses given during the course period
Questions	The average score of homework during the course
Responses	Semester score
Homework score	
Semester score	

3.3 Method

Statistical analysis was performed in SPSS v. Continuous variables are presented as averages and standard deviations, and the t-test was used to test for differences between the two groups. Category variables are presented as percentages, such as for gender and college, and a deductive statistical test was conducted with the chi-square test.

4. RESULT

The total number of students in the Natural Science digital curriculum was 659, consisting of 364 females (55%) and 295 males (45%). The distributions of each variable for the two groups are shown in Table 4. We found 13 variables having statistically significant differences ($p<0.05$), including loan record, semester score, percentile class, percentile_dept, warning, counseling, books borrowed, absenteeism, materials, homework, questions, homework score and semester score. In other words, significant gender differences were found.

Table 4 Gender Analysis of Students' Learning Performance in Natural Science digital curriculum

	Female		male		
	sample	average± standard deviations	sample	average± standard deviations	p *
	364		295		
Loan					
N	250	68.68%	227	76.95%	0.0183
Y	114	31.32%	68	23.05%	
Semester score	364	79.39±8.93	295	71.56±10	<0.0001
Percentile class	364	48.34±25.2	295	66.28±22.47	<0.0001
Percentile_dept	364	47.57±25.01	295	66.08±22.57	<0.0001
Warning					
N	128	35.16%	37	12.54%	<0.0001
Y	236	64.84%	258	87.46%	
Counseling					
N	339	93.13%	243	82.37%	<0.0001
Y	25	6.87%	52	17.63%	
Library use	364	34.38±50.35	295	36.71±57.33	0.5842
Books borrowed	364	12.94±31.23	295	7.83±19.35	0.0104
Absenteeism	364	42.55±49.25	295	78.27±71.22	<0.0001
Leave	364	20.09±24.05	295	23.91±37.72	0.1326
Suspension					
N	356	97.8%	282	95.59%	0.1084
Y	8	2.2%	13	4.41%	
Dropout					
N	344	94.51%	280	94.92%	0.8156
Y	20	5.49%	15	5.08%	
Work					
N	353	96.98%	286	96.95%	0.9829
Y	11	3.02%	9	3.05%	
Records of Digital course					
Materials	364	79.45±40.75	295	65.53±40.09	<0.0001
Homework	364	11.83±5.15	295	10.17±6.37	0.0003
Questions	364	10±3.97	295	8.63±4.92	<0.0001
Responses	364	0.22±1.15	295	0.19±1.04	0.753
Homework score	341	80.22±10.47	263	76.18±18.6	0.0017
Semester score	361	76.12±16.03	295	68.85±19.61	<0.0001

The total number of students taking the Humanities and Social Science digital curriculum was 923, consisting of 546 females (59％) and 377 males (41％). The distributions of each variable for the two groups are shown in Table 5. We found 12 variables having statistically significant differences ($p<0.05$): loan record, semester score, percentile class, percentile_dept, warning, counseling, books borrowed, absenteeism, materials, homework, homework score and semester score. In other words, significant gender differences were found.

Table 5 Gender Analysis of Students' Learning Performance in Humanities and Social Science digital curriculum

	Female		Male		
	Sample	average± standard deviations	Sample	average± standard deviations	p*
	546		377		
Loan					
N	390	71.43%	295	78.25%	0.0199
Y	156	28.57%	82	21.75%	
Semester score	546	80.07±8	377	73.13±9.74	<0.0001
Percentile class	546	47.03±24.74	377	64.74±22.67	<0.0001
Percentile_dept	546	46.9±24.76	377	64.67±22.89	<0.0001
Warning					
N	171	31.32%	57	15.12%	<0.0001
Y	375	68.68%	320	84.88%	
Counseling					
N	503	92.12%	300	79.58%	<0.0001
Y	43	7.88%	77	20.42%	
Library use	546	34.61±60.75	377	27.65±49.58	0.0564
Book borrowed	546	10.7±26.48	377	5.88±20.44	0.0019
Absenteeism	546	37.88±50.8	377	66.39±64.29	<0.0001
Leave	546	18.88±24.87	377	16.89±26.84	0.2476
Suspension					
N	530	97.07%	361	95.76%	0.2836
Y	16	2.93%	16	4.24%	
Dropout					
N	525	96.15%	363	96.29%	0.9174
Y	21	3.85%	14	3.71%	
Work					
N	525	96.15%	361	95.76%	0.762
Y	21	3.85%	16	4.24%	
Records of Digital course					
Materials	546	53.19±38.9	377	43.57±35.69	0.0001
Homework	546	4.01±3.41	377	3.4±3.33	0.0072
Questions	546	2.38±2.45	377	2.4±2.33	0.8851
Responses	546	0.12±0.93	377	0.01±0.11	0.0103
Homework score	68	76.07±16.82	22	62.55±30.39	0.0576
Semester score	393	79.58±20.14	311	67.31±26.95	<0.0001

5. DISCUSSION

Based on the distribution of the variables and the differences identified by the t-test and the chi-square test, the two groups showed significant differences in learning performance. Focusing on cross analysis of some variables, including gender, loan record, books borrowed and absenteeism, the total number of students who attended the digital courses was 1,582, of which 910 (57.5%) were female and 672 (42.5%) were male. Students in the Humanities and Social Science digital courses outnumbered those studying natural science, which is consistent with the findings of the general study. The school load ratio of females was higher than that of males, and females borrowed more books and had a lower absenteeism ratio. These three variables showed significant gender effects. These results may be due to the digital curriculum requiring more autonomy and flexibility. Students could work on the courses when convenient and watch the materials and videos repeatedly according to their own needs, so they had no need to visit the school often. Such a design met the needs of female disadvantaged students, who developed autonomic learning habits and valued resources such as books borrowed from the library.

From the academic performance indicators, the number of courses with females and the semester average grades and rankings were better than those of males. Females received fewer warnings and received less counseling than males to significant degrees. Regarding the digital course learning process, regardless of the humanities and social science or natural science courses, females accessed the digital materials and videos more, handed in more homework, and received higher semester grades than males, all of which were significant differences. The results of this analysis also echo the findings of previous scholars. Liu Huiruo (2000) put forward the view that learning behavior and semester results are closely related to participation in higher learning activities, and the results of the semester grades are also better. Richard D. Johnson pointed out in 2011 that women communicate more in digital studies, have a greater sense of social presence in the environment, are more satisfied with the curriculum, find the course more valuable, and have a slightly better performance than males. As stated by Justine Perkowski (2013), women perform better than men in terms of academic performance and self-efficacy in a digital learning environment.

Some of the necessary components of a digital course are teaching, assessment, peer learning, and teacher-student communication. If there is no discussion, questioning or other acts, the digital course is only auxiliary materials and not really a course (Hongming Chau, 2009). In this study, the process records of the digital course revealed that, in terms of the interactivity of asking questions and giving responses for females and males, respectively, the highest and lowest average numbers of questions were 10 ± 3.97 and 2.4 ± 2.33, and the lowest average numbers of responses were 0.22 ± 1.15 and 0.01 ± 0.11. The interactions between teachers and students or peers in the digital courses are insufficient. The reasons for these phenomena are worth exploring further so as to provide teachers who design and teach digital courses details of the learning situations of their students and improve upon them.

6. CONCLUSION

In recent years, universities worldwide have offered digital courses, but little research has been conducted on digital learning performance. Even fewer studies have examined gender differences using data on the student digital learning process. In this study, we used a school database to examine two groups of students with a focus on 24 variables, including students' personal backgrounds, learning performance during the school year, and the outcomes of digital courses. From this empirical research, we found that females in natural science classes and in humanities and social science classes outperform males, not only in digital courses but also in their overall learning outcomes during the school year.

One of the greatest values of this study is that the analysis was conducted using the empirical data of students in three academic years, as compared with the analysis of questionnaire surveys to obtain students' self-evaluations, or short-term data. This more detailed empirical analysis sheds light on gender differences in the digital learning performances and student needs in the learning process. Establishing a personalized learning model for individual students of different genders and improving students' learning performance will be the direction of the next stage of research.

7. ACKNOWLEDGMENTS

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科技部補助專題研究計畫項下出席國際學術會議心得報告

日期：107 年 10 月 20 日

出國人員 姓名	蕭玉真	服務機構 及職稱	致理科技大學 副教授
會議時間	107 年 1 月 11 至 107 年 1 月 13	會議地點	美國聖地牙哥
會議名稱	(中文)第 9 屆數位教育、數位商務、數位管理和數位學習國際研討會 (英文) 2018 9th International conference on E-Education, E- Business, E-Management and E-Learning (IC4E)		
發表論文 題目	(中文)探討大學生數位學習績效之性別差異 (英文)Research on Gender Differences in the Digital Learning Performance of University Students		

一、參加會議經過：

第 9 屆數位教育、數位商務、數位管理和數位學習國際研討會(IC4E)為一年舉辦一次的國際學術研討會，今年為第 9 屆，於 2018 年 1 月 11 至 1 月 13 日在美國聖地牙哥的 Holiday Inn San Diego Bayside, San Diego 舉行，為期 3 天。會議有來自各國許多不同領域的優秀學者參加，藉由參與研討會可以和與會人員交換心得並聽取意見，也同時開拓視野與其他國外學者交流，並對其他國家在數位學習的發展現況上，有進一步的了解，研究者發表時，有位香港中文大學學者，對台灣校務研究的發展及本文發表內容，有關數位學習對女性經濟弱勢學生有顯著幫助這部分非常有興趣，提出後續合作研究的邀請。

本人在此會議發表論文並擔任該場次主持人，報告時間是在 1 月 12 日下午的第 4 個 session，時間是下午 3 點 30 分至 5 點 15 分，本人為此場次第一位發表者，本人發表後，有 4 位其他國家學者提

問，也經本人一一解釋說明；同場次另有 6 位學者進行論文發表，會議過程進行順利。

二、與會心得

此次會議本人獲益良多，除來自與會人員的提問、心得交換及互邀合作研究外，不單是對本人目前的研究有所助益，也同時開拓研究上的視野，及發現大學校務研究確實是可以發現及解決大學存在的某些問題，並提出改進策略，讓學校校務發展更順利。另外，因為此次是本人第一次擔任國際研討會論文主持人，有些興奮及緊張，也學到不少。本次會議有 4 個場次，將近 70 篇論文於此進行發表，且有各國重要教育及商務等學者與會，對於了解當前數位學習及數位管理與商務等發展趨勢，有進一步深入的了解

三、建議

此類研討會規模一年比一年擴大，且每年均有各國重要領域學者參加，建議提高出國補助額度，使老師有更多學習機會、更具國際觀並在研究上有所突破，及增加跨國學者合作機會。

四、攜回資料名稱及內容

1. Program and book of Abstracts：內容為會議議程與投稿者之論文摘要
2. 大會附贈提包一只。

五、其他

獲邀擔任 IC4E 2019 committee 委員及論文 reviewer，可以有另一種學習經驗。

106年度專題研究計畫成果彙整表

計畫主持人：蕭玉真	**計畫編號：**106-2629-H-263-001-
計畫名稱：探討大學生數位學習績效之性別差異及研訂適性化學習模式(重點代號 :K02)	

成果項目					量化	單位	質化 （說明：各成果項目請附佐證資料或細項說明，如期刊名稱、年份、卷期、起訖頁數、證號...等）
國內	學術性論文	期刊論文			0	篇	
		研討會論文			0		
		專書			0	本	
		專書論文			0	章	
		技術報告			0	篇	
		其他			0	篇	
	智慧財產權及成果	專利權	發明專利	申請中	0	件	
				已獲得	0		
			新型/設計專利		0		
		商標權			0		
		營業秘密			0		
		積體電路電路布局權			0		
		著作權			0		
		品種權			0		
		其他			0		
	技術移轉	件數			0	件	
		收入			0	千元	
國外	學術性論文	期刊論文			1	篇	研討會proceeding被 ACM Digital Library 收錄 及獲 EI Compendex and Scopus 納入索引
		研討會論文			1		於2018 IEDRC USA Conferences 國際研討會上發表，與與會國際學者交流並聽取意見，提升台灣學術研究於國際上之能見度，並獲邀請擔任其中一場論文的主持人。
		專書			0	本	
		專書論文			0	章	
		技術報告			0	篇	
		其他			0	篇	
	智慧財產權及成果	專利權	發明專利	申請中	0	件	
				已獲得	0		
			新型/設計專利		0		
		商標權			0		

		營業秘密	0		
		積體電路電路布局權	0		
		著作權	0		
		品種權	0		
		其他	0		
	技術移轉	件數	0	件	
		收入	0	千元	
參與計畫人力	本國籍	大專生	1	人次	學生學習到簡單資料探勘與統計分析觀念與技巧、從多元性別角度思考及了解學生學習之差異、及計畫的管理及執行進度的掌控等，從這些學習過程，可訓練研究及資料分析能力，助益其未來升讀研究所後，研究工作的進行。
		碩士生	0		
		博士生	0		
		博士後研究員	0		
		專任助理	0		
	非本國籍	大專生	0		
		碩士生	0		
		博士生	0		
		博士後研究員	0		
		專任助理	0		
其他成果 （無法以量化表達之成果如辦理學術活動、獲得獎項、重要國際合作、研究成果國際影響力及其他協助產業技術發展之具體效益事項等，請以文字敘述填列。）			於2018 IEDRC USA Conferences 國際研討會上發表，與與會國際學者交流並聽取意見，提升台灣學術研究於國際上之能見度，並獲邀請擔任其中一場論文的主持人。		

科技部補助專題研究計畫成果自評表

請就研究內容與原計畫相符程度、達成預期目標情況、研究成果之學術或應用價值（簡要敘述成果所代表之意義、價值、影響或進一步發展之可能性）、是否適合在學術期刊發表或申請專利、主要發現（簡要敘述成果是否具有政策應用參考價值及具影響公共利益之重大發現）或其他有關價值等，作一綜合評估。

1. 請就研究內容與原計畫相符程度、達成預期目標情況作一綜合評估
   ■達成目標
   □未達成目標（請說明，以100字為限）
   　□實驗失敗
   　□因故實驗中斷
   　□其他原因
   說明：

2. 研究成果在學術期刊發表或申請專利等情形（請於其他欄註明專利及技轉之證號、合約、申請及洽談等詳細資訊）
   論文：■已發表　□未發表之文稿　□撰寫中　□無
   專利：□已獲得　□申請中　■無
   技轉：□已技轉　□洽談中　■無
   其他：（以200字為限）

3. 請依學術成就、技術創新、社會影響等方面，評估研究成果之學術或應用價值（簡要敘述成果所代表之意義、價值、影響或進一步發展之可能性，以500字為限）
   雖然近些年世界各國大學紛紛開設數位課程，但學術界對於數位課程學習績效的研究不多，有關性別差異之研究更少，運用學生數位學習歷程資料探討性別差異分析的研究則付之闕如。本研究針對上述研究之不足，運用學校校務資料庫中，男女兩組樣本學生的個人背景與在學學習表現等23個變項的資料所作之分析，實證研究發現，1. 女性修讀學生數多於男性；2.數位學習可能是女性經濟弱勢學生最佳的選擇，可能因為數位學習於時間及空間上比較具自主性與彈性，不需要經常到學校上課，且能根據自己需求反覆練習，也因而養成其自主學習及珍惜資源至圖書館借閱圖書的習慣；3.此50門數位課程中，從數位學習歷程中提問與回應之互動行為來看，師生或同儕互動次數不算多，這些是值得再探討的原因，以改進數位教學。

   本研究最大價值之一，在於運用3學年學生在學期間各項實證資料所做的分析，相較於以問卷調查方式取得學生自評式短期資料的分析來得更完善與詳實，惟如以實證資料加上學生問卷調查的交叉分析，應更能瞭解學習績效的性別差異原因與學生學習過程的需求，以建立不同性別學生個人化的數位學習輔導模式，及提升學生學習績效，此為下階段亟待研究之方向。

4. 主要發現

本研究具有政策應用參考價值：□否 ■是，建議提供機關教育部,

（勾選「是」者，請列舉建議可提供施政參考之業務主管機關）

本研究具影響公共利益之重大發現：■否 □是

說明：（以150字為限）