科技部補助專題研究計畫成果報告
期末報告

調查學習型態和個人電子產品的使用及其對大學生在台灣學習成績之間的關係

計 畫 類 別 ： 個別型計畫
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執 行 單 位 ： 致理學校財團法人致理科技大學應用英語系(科)

計 畫 主 持 人： 陳汝珊

計畫參與人員： 此計畫無其他參與人員：陳汝珊

中 華 民 國 105 年 12 月 25 日

中 文 摘 要 ： 本研究旨在研究台灣不同地區之大學生的個人電子使用產品、學習型態對學業成績的影響。第一個研究目的旨探討學生的個人電子使用產品使用行為是否會影響其學業成績。第二個目的旨在探究學生的個人電子使用產品行為與學習型態和學業成績之間的影響。研究工具午要包含研究者自行設計之問卷、Kolb3.1 版之學習型態問卷和學生的學業成績。

中 文 關 鍵 詞 ： 個人電子使用產品，學習型態，學業成績

英 文 摘 要 ： This study investigated the relationship among students ‘ personal electronic device (PED) usage, learning style, and academic achievement for college students in Taiwanese. The first study purpose was determine whether or not use of PEDs relates to student academic achievement as measured by grade average (GPA). Second, the study sought to explore the moderating effect of student learning style on use and academic achievement—GPA. Instruments included a researcher-designed questionnaire, Kolb ‘s Learning Style Inventory Version 3.1, and students ‘ GPAs.

英 文 關 鍵 詞 ： Personal electronic devices (PEDs), learning style, academic achievement

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計畫類別：個別型計畫
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計畫主持人：陳汝珊
共同主持人：無
計畫參與人員：無

本計畫除繳交成果報告外，另含下列出國報告，共 ___ 份：
□執行國際合作與移地研究心得報告
□出席國際學術會議心得報告
□出國參訪及考察心得報告

中　華　民　國 105 年 10 月 15 日

Abstract

This study investigated the relationship among students' personal electronic device (PED) usage, learning style, and academic achievement for college students in Taiwanese. The first study purpose was to determine whether or not use of PEDs relates to student academic achievement as measured by grade point average (GPA). Second, the study sought to explore the moderating effect of student learning style on PED use and academic achievement—GPA. Instruments included a researcher-designed questionnaire, Kolb's Learning Style Inventory Version 3.1, and students' GPAs.

Key words: Personal electronic devices (PEDs), learning style, academic achievement

Table of Contents

1. Introduction

Technology not only changes the way people live but also how people access information through different generations and times. Each generation has its own unique character due to its historical background and life experiences. Although different generations have no exact, distinct start, this study used the most frequently used dates to distinguish them as addressed in most literature. A short overview of these generations is given to provide a general idea of how each generation acquired education learned in their learning environment in a different space and time.

The generation called the Baby Boomers refers to those who were born from 1946-1964 after the end World War II. The Boomers were also known as the TV generation because the development of TV was expanding during the 1940s. The learning environment for the Boomers tended to be teacher-oriented; students immersed in a passive information receiving environment (Sprenger, 2009). After the Boomers came Generation X; Gen X, those who were born between approximately 1965 to1980, grew up during the era when home computers came into their own and Internet was first invented (Leiner et al, 2009). Different from the baby boomers or generation X, Generation Y, people born after 1981, grew up with computers and a technological environment. These individuals are also known as Net Generation (Net Gens), Millennial Generation, and Digital Natives (Ethical Resource Center, 2010; Oblinger, 2003; Prensky, 2001; Sprenger, 2009). World industry studied to find whether or not Gen Y would act differently from the previous generation in the work place (ERC, 2010; Smola & Sutton, 2002).

In the educational field, John Dewey (1947) had earlier pointed out the importance of linking experience with learning in education. During the past few decades, experiential learning has been getting more and more attention partly due to rapid changes in human society (Lewis & Williams, 1994). Based upon Dewey's idea of learning through experience, some researchers considered whether or not Gen Y could benefit and maximize learning through the traditional education system. These students desire to grasp information and absorb knowledge accessed anytime and anywhere though personal electronic devices (PEDs) such as laptops, smart phones, tablets, etc. Researchers recommended careful consideration of these changes and address them with well-thought out policies and curricula (Khalid, Chin, & Halten, n.d.; Zhu, Kaplan, Dershimer, & Bergom, 2010). The question arises, what influences may PEDs bring to Gen Y in the 21st century?

Recognizing how college students learn, what motivates them to learn, and how they process information they obtain—possibly through various persona electronic devices—may shed light on potential drawbacks to consider in regard to the use of PEDs in education. On another hand, if PEDs can help create different learning experiences, perhaps they can help educators to teach more effectively and efficiently and better design the curricula to meet students' individual needs and growth.

This study explores the relationship between Taiwanese college students' PED usage and academic performance, as well as the correlation between their PED usage and learning styles. As Fairhurst and Fairhurst (1995) pointed out, once teacher can recognize students, both teachers and students can benefit from this information, which may yield more optimal teaching and learning processes and help students attain higher academic performance. Likewise, when students know more about their own learning styles; they can minimize their effectiveness in cognitive skills, perform better at school, and develop positive learning attitudes (Keefe, 1988).

1.1 Statements of the Problem

Dramatic growth and development in technology seems to have brought to society a downside: distraction. This is especially true with the pervasiveness of connection with Wi-Fi, GPS, or GSM; people can easily access the cyber world anytime and anywhere. Recently Taiwan ranked third highest in density of Internet users in Asian. For people age 15 to 19, the rate of online wireless use increased 19.01% from 2012 to 2013 (Taiwan Network Information Center [TWNIC], 2013). Related statistics showed that student use rate of PEDs for wireless connection increased substantially. How does this relate to most college students, those whose brain frontal lobes are still developing? Because the frontal lobe functions as the cognitive center for morality, decision making, problems solving, abstractive thinking, and attention focusing it is identified with higher levels of cognitive construction, and it is influenced by experience (Sousa, 2006; Wolfe, 2010). Therefore, knowing whether or not there is a link between students' PED use and their academic performance seems to be a worthy priority which for parents and educators to consider. Such a concern is especially apropos to educators in Taiwan.

While student hands on experiences with PEDs keep increasing, Kolb's (1984) experiential learning theory seems to provide an appropriate means of exploring students' active involvement in learning related to learning styles (Lewis & Williams, 1994; McCarthy, 2010; Muyinda, Mugisa, & Lynch, 2007). For educators an understanding of how students learning involvement or styles associate with their hands on PED activity is attention worthy. Since little is known about how students' PED usage and learning styles affect academic performance, this study aimed to examine these phenomena with a sample of college students in Taiwan.

1.2 Purpose of the Study

The first purpose of this study was to investigate whether or not personal electronic devices (PEDs) use related to students' academic achievement. Second, explore the relation between PEDs use and achievement effects by students learning style among Taiwanese college students. Finding students learning styles associate with PED usage and academic performance may be a key to teacher's teaching and students' learning improvement in higher education to a new information and technology exploration era.

2. Literature review

2.1 Kolb's Experiential Learning Theory (ELT)

Based on Piaget' cognitive theory and other well know scholarly theories such as Carl Jung's psychological theory, Jean Piaget's cognitive theory, Kurt Lewin's action research, and John Dewey's experiential learning premise, Kolb (1984) contributed his experiential learning theory (ELT). ELT mainly focuses on how experience influences individuals' learning (Kolb, Boyatzis, & Mainemelis, 2001) in ways that differ from cognitive learning with its emphasis on cognition more than affect, and behavioral learning, which denies any mental process during learning (Wikibooks contributors, 2006, p. 19). This study chose

Kolb's ELT as a major learning style model because it may help educators to understand how students process information through personalization and is suitable for exploring students' hands-on experiences in using personal electronic devices (PEDs) (Cassidy, 2004; JilardiDamavandi, Mahyuddin, Elias, Daud, Shabani, 2011; Muyinda, Lynch, & Mugisa, 2007).

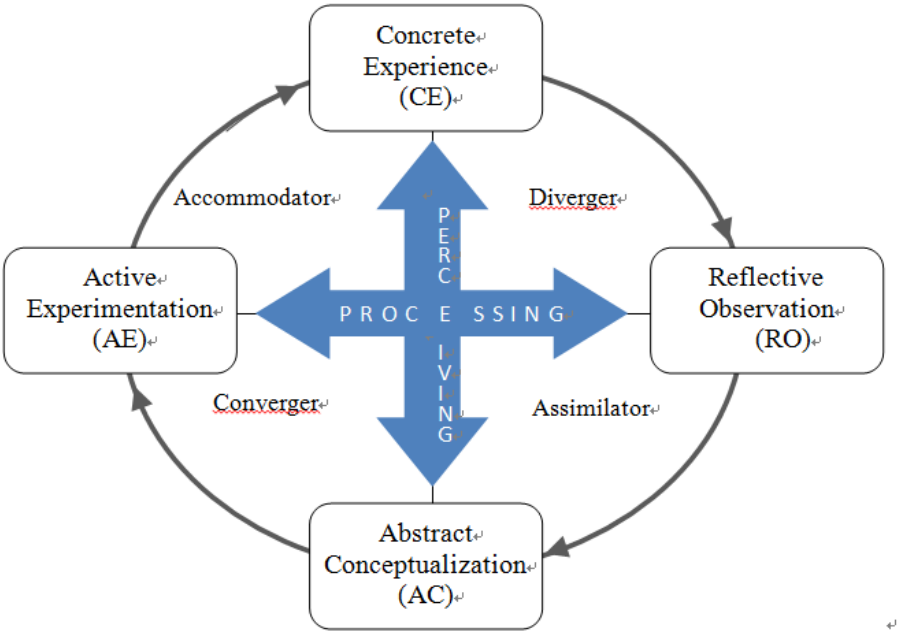

Figure 2.1. Experiential Learning Theory and Learning Styles. Adapted by D. Kolb (1984). *Experiential learning: Experience as the source of learning and development,* p. 42, and B. McCarthy & D. McCarthy (2006). *Teaching around the 4MAT cycle,* p. 1.

From Kolb's (1984) perspective, the process of learning is full of tension because learners have to construct the new knowledge and choose different learning abilities in particular situations. These learning abilities, as Kolb described them, a four-stage cycle that includes the learning from concrete experience (CE), reflective observation (RO) abstract conceptualization (AC), and active experimentation (AE) (p. 30). The four-stage cycle is

composed by the two major dimensions— perceiving and processing experiences (McCarthy, 2006) as shown in Figure 2.1 (p.3). In perceiving experience, the vertical axle shows the tension between concrete experience (CE) and abstract conceptualization (AC). In processing experience, the horizontal axis points to the conflict between active experimentation (AE) and reflective observation (RO) (Kolb, 1984, p. 30). An effective learner, needs to work with these four capacities — CE, RO, AC, and AE in order to resolve the conflict in different situations (Kolb, 1984, p. 30; Kolb & Kolb, 2005, p. 10).

Kolb's ELT was expanded by McCarthy (1990), who "has been a major collaborator in the world of elementary and secondary education" (Kolb, 1984, xii). She developed the Four Mode Application Techniques (4MAT) based on Kolb's learning cycle and from a neuroscience perspective of left and right hemisphere in the brain. The 4MAT includes an eight step design of instruction to reach different learners with different learning styles. 4MT has been used and supported by many practitioners in the U.S. (Coffield, Moseley, Hall and Ecclestone, 2004).

2.2 Kolb's Learning Style Inventory (LSI)

Based on the experiential learning theory (ELT), Kolb developed several versions of a learning style inventory (LSI) during the last four decades. This study used version 3.1 which was revised in 2005. The LSI has been widely used in the contexts of medicine, psychology, management, accounting and law, computer studies and educational fields (Kolb, Boyatzis, & Mainemelis, 2001). As Kolb and Kolb (2005) mentioned, previous research with the instrument has identified four learning styles that are associated with different approaches to learning— Diverging, Assimilating, Converging, and Accommodating" (Kolb & Kolb, 2005, p. 4) (see Figure 1.1.) According to Kolb (1984) and Kolb & Kolb (2005), the characteristics of these four learning styles can be described as follows:

Diverging. This means to extend differences from a common sense (Merriam-Webster's Collegiate Dictionary, 2003). People with diverging style are dominated by concrete experience (CE) and reflective observation (RO). Learners with diverging styles tend to be imaginative and feeling-orientated; they are interested in observing people and situation and being aware of culture differences. Divergers are good at generalizing ideas and brainstorming. They are often recognized as creative learners (Cassidy, 2004).

Assimilating. The word itself means to absorb and utilize knowledge (Merriam-Webster's Collegiate Dictionary, 2003). Assimilative learners are dominated by reflective observation (RO) and abstract conceptualization (AC). Assimilators generally arrange information effectively and can provide clear and precise explanations. Learners with assimilating style think theories that make sense are more important than practical applications; they are more interested in ideas or abstract concepts than people. These individuals tend to have work that requires dealing with information and science.

Converging. To converge means to come together and unite using common sense

(Merriam-Webster's Collegiate Dictionary, 2003). Learners with converging style are dominated by abstract conceptualization (AC) and active experimentation (AE). Convergers act practicality based on their understanding and abstract conceptualization of the new knowledge. They are more interested in solving problems and doing technical assignments than dealing with interpersonal relationship, which is the opposite of divergers. Convergers tend to be in specialist and technology careers.

Accommodating. Accommodators adapt and adjust themselves to the situation (Merriam-Webster's Collegiate Dictionary, 2003). Those who are called accommodating are dominated by active experimentation (AC) and concrete experience (CE). Different from assimilators who like analyze technical information, accommodators prefer hands-on learning. Accommodators are also risk takers, relying on others' help to gather information rather than on their own analytic ability. Learners with accommodating style try to solve the problems with different approaches and are action-orientated learners.

2.3 Kolb's Experiential Learning Style Inventory (LSI) and Academic Achievement

A number of studies have examined the relationship between learning styles and academic achievement. Many research findings reported that students' learning styles have significant correlation with their academic achievement. For example, learners who were convergers and assimilaters tended to achieve higher grades than did divergers and accommodators (Cagiltay, 2008, JilardiDamavandi, Mahyuddin, Elias, Daud, & Shabani, 2011; Lu, Jia, Gong, & Clark, 2007). However, studies can also be found with results showing that either those with converging learning styles (Boyatzis & Mainemelis, 2000) or diverging and assimilating learning styles achieve higher grades in concept maps (Oughton & Reed, 2000) when compared with those with other types of learning style, a fact which may be linked to cultural issues (JilardiDamavandi et al., 2011).

In Taiwan, many studies have used Kolb's (1976, 2005) learning style inventory to measure individuals' learning styles as related to academic performance from junior high school students to college students. According to these studies, the majority of Taiwanese student learning styles are divergent followed by accommodative. Assimilative and convergent are the minority learning styles (Hou, 2007; Sun & Ho, 2010). However, when students are in a specialized field or major such as master of business administration (MBA) or executive master of business administration (EMBA), engineering, or senior high school students, there are some exceptions (Chang, Wen, & Chen, 2011; Chen, 2005; Tsai, 2004).

2.4 Studies of PED Usage and Academic Achievement.

For the past few decades while some studies have sought the relationship between learning styles and academic achievement (Carthey, 1993), another angle from which to look at students' academic achievement is to understand how their PED usage relates to their academic achievement, especially in this 21st century PED ubiquitous environment.

Of the studies that focus on the relationship between students' PED usage and academic

achievement, many have found positive effects of students' in-class laptop use. The benefits of using laptops for educational related purposes such as electronic note taking and the use of educational software for learning, included increased student learning satisfaction, motivation, attention, cooperation, problem solving skills, promotion of hands-on active exploratory learning, and higher academic achievement (Barak, Lipson, & Lerman, 2006; Zhu et al., 2010). Along with these advantages, the use of laptops in classrooms can also be a distraction with interference from both the user and fellow students if they use laptops for non-learning purposes (Barak et al., 2006; Zhu et al., 2010).

Considering PED usage associated with non-learning and their distraction for students, several studies have shown a negative relationship between students' PED usage and their academic achievement. For example, when students used laptops in the classroom, if they spent constant time on the web browsing or multitasking, they had lower grades for the overall course performance (Grace-Martin & Gay, 2001). In addition, when college students used cell phones for texting messages frequently, they performed poorly on academic grades (Harman & Sato, 2011). Another disadvantage of PED use is related to the relationship between students' video game playing in association with school performance. Studies have found a negative correlation between grades and students' time spent on video games (Anand, 2007; Burgess, Stermer, & Burgess, 2012). However, one study found no significant relationship and it included both television viewing and game playing.

In summary, with the pros and cons of student use of PEDs, researchers have found mixed conclusions from various studies regarding whether or not PED usage improves academic performance. Some showed a positive impact on academic performance (Barak et al., 2006; Zhu et al., 2010); some studies found that PED use has a negative impact on academic performance (Grace-Martin & Gay, 2001; Harman & Sato, 2011).

The study of individual differences has captured researchers' interest in finding the relation these differences have with students' academic achievement for decades. Different learning styles have been acknowledged as to academia research through many nations. Kolb's LSI is one of the most popular learning style measurements that have been widely used by researchers to find the relationship between students learning styles and academic achievement in different countries from elementary to higher education. Examples of these studies follow.

JilardiDamavandi, et al. (2011) studied 285 high school students in eight different public schools in Tehran, Iran to seek the relationship of learning styles with academic achievement. The study results showed significant differences in the four types of learners with their average grades in five different subjects.

Students who were convergers and assimilators particularly achieved higher grades than students who were divergers and accommodators. JilardiDamavandi, et al. attributed these explained study results to three reasons. First, these 16-year-old Iranian students tended to

develop their abstract conceptualization more than concrete experience to achieve higher grades in abstract conceptualization (AC). AC is those who perceive experience through abstract conceptualization and process information by reflective observation (RO) and active experimentation (AE). The two different learning styles in between AC-RO is assimilator and in AC-AE is converger.

The study results implied that providing students a learning environment suitable for their learning styles is important. This comes as a result of whether or not teachers provide balanced teaching styles to students in important, too (JilardiDamavandi, et al., 2011).

2.5 Personal Electronic Devices (PEDs), Learning Styles and Academic Achievement

Research studies have reported that e-learning and learning styles are strongly connected (Bechter & Esichaikul, 2008; Manochehr, 2006). E-learning, defined as "individualized instruction delivered over public (Internet) or private (Intranet) computer networks" (Manochehr, 2006, p. 10). E-learning "involves the use of computer or electronic devices (e.g. a mobile phone)" to provide different means of educational training and learning. According to Kolb, learning is "the process whereby knowledge is created through transformation of experience" (Kolb, 1984, p. 38). Students may transfer their experiences using personal electronic devices (PEDs) to e-learning or vice versa, for almost every PED has computing and wireless functions, allowing people to access the Internet anytime and anywhere (Manochehr, 2006). A few researchers used Kolb's experiential learning theory (ELT) combined with Piaget's (Piaget & Inbelder, 1969) cognitive development theory to seek students learning styles, related to e-learning, and academic achievement (Bechter & Esichaikul, 2008; Manochehr, 2006;). Although these are somewhat related to the current study, they do not directly address PED usage. Before reviewing these related studies, Kolb's (1984) experiential learning theory (ELT), and the combination of Kolb's (1984) and Piaget's theory will be reviewed briefly.

2.6 Studies of PED Usage, Learning Styles and Academic Achievement

Research studies of PED usage that are not limited to only one type of PED (e.g., laptop, cell phone, etc.) and its academic achievement consequences are relatively few. Similarly, research on students' PED usage, academic achievement, and learning styles has not been widespread. Few studies can be found illustrating the direct relationship between PED usage and Kolb's (1984) learning styles. Some researchers, however, have studied e-learning in relation to learning style and achievement.

3. Research Methodology

3.1 Research Question and Hypotheses

Research Question

The research questions of this study are the following:

1. Does student usage of PEDs affect their academic achievement?
2. Does student learning style moderate the relationship between their usage of PEDs and

academic achievement?

Hypotheses

The following hypotheses have been used in this study:

1. Students' PED usage as a whole negatively associates with academic achievement
2. The effect of PED usage on academic achievement is significant for divergent and accommodative learners but not for convergent and assimilative learners.

3.2 Instrument

The survey instrument employed in this study for data collection has two sections. The first section was a researcher-designed questionnaire to gain information on demographics and PED usage. The second section was the Kolb learning style inventory Version 3.1 (KLSI 3.1) by Kolb (2005) and was used to measure student's learning styles.

4. Results of Data Analysis

4.1 Descriptive Statistics

The demographic statistics for student gender, major, and age. Among the 1,218participants there were 241 (19.8 %) males and 977 (80.2%) females. Of the four groups of majors, business management had the most students (n = 684, 56.2%), language ranked second (n = 106, 33.3%), an art major group represented the lowest number (n = 78, 6.4%), and information technology ranked the lowest number (n = 50, 4.1%). The mean age of the sample was 19.4 years of age with an age range of 16-59 years.

4.2 Hypothesis Testing

4.2.1 Hypothesis 1

H1: Students' PED usage as a whole negatively associate with academic performance

The first research hypothesis focused on whether students' PEDs usage as a whole associated negatively with their academic achievement. The study results of Hypothesis 1 can be divided into two parts. In the first part, the main hypothesis testing pitted daily PED use time against students' grades. In the second part, a supplementary analysis broke down the PED usage into different purposes and sought how each of these different purposes associated with students' grades.

According to the study results, a negative correlation was found between students PED time use with academic achievement. Furthermore, when students used PEDs for interactive entertainment and texting purposes, students got lower grades. However, if students used PED for educational purposes, students tended to achieve higher GPAs than those who did not use them for educational purposes.

4.2.2 Hypothesis 2

H2: The effect of PED usage on academic achievement is significant only for divergent and accommodative learners but not for convergent and assimilative learners.

The second research hypothesis focused on whether students' PEDs usage has a negative impact on their GPA according to their learning style profiles. In particular, this hypothesis

posited that the academic achievement of both divergent and accommodative learners would be impacted negatively by PED use.

According to the statistical testing results, there was a negative collection was found with divergent and assimilative learners but not with accommodative learners and PED time use. For example, if divergent learners spend more time for communicational purposes, the lower GPA they tend to get. Furthermore, the longer time the assimilative learners used PEDs for interactive entertainment purposes, the lower the GPA. However, if both divergent and assimilative learners used PEDs for educational purposes, they experienced a positive impact on their GPAs.

5. Conclusion and Recommendations

5.1 Conclusion

Two main conclusions could be drawn from the study results. First, student PED usage did have a negative impact on Taiwanese college students' academic achievement, especially when used for interactive entertainment and texting purposes. However, if students used PEDs for educational purposes, academic achievement levels improved. Rosen (2010) suggested, "We can no longer ask our children to live in a world where they are immersed in technology in all parts of their lives *except* when they go to school" (p. 226). Accordingly, instructional plans need to be carefully designed to include PED usage along with other learning materials in the class in order to maximize students' engagement and learning ability.

Second, while the PED usage for interactive entertainment and texting purposes impacted both divergent and assimilative learners negatively. Another finding was that if students spent their time using PEDs for educational purposes, their grades improved. This may suggest a need for instructors to design explicit curricula to include different kinds of stimulation, thus extending students' learning and offering opportunities to perceive information through both concrete and abstract experiences and processes and through both internal and external stimuli. As Kolb (1984) recommended in his experiential learning theory (ELT), such a program could benefit students with various learning styles and could provide a more balanced learning environment.

5.2 Recommendations

5.2.1 For Schools and Instructors

Triggered by the speeding growth of technology, people can receive information from many kinds of media anytime anywhere. "Content" plays a critical role (Carr, 2010) as people use PEDs to connect with the Net. Similarly, teaching "content" plays a determining factor in whether or not learning is effective for students (Willingham, 2008). When teachers plan or design a meaningful curriculum, they need to take into consideration how students process information cognitively and within their own learning type preferences. Even though it seems difficult for teachers to recognize each student's differentiation individually, teachers

can design meaningful courses that include various teaching strategies and contents so that all students have opportunities for vivid lessons and for absorbing knowledge easily.

McCarthy (1984) developed a brain-friendly teaching/learning schema called 4MAT (Four Mode Application Techniques), which is based on Kolb's (1984) experiential learning model—the model utilized in this study. The 4MAT teaching techniques follow Kolb's learning cycle, which takes the four learning styles into consideration during curriculum design. Research on 4MAT has shown that student grades improve more when teachers utilize the 4MAT model in classroom instruction as compared with traditional teaching methods (Blair & Judah, 1990; Kelly, 1990; Lee & Hung, 2009; Nicoll-Senft & Seider, 2009; Tatar & Dikici, 2009; Weber & Weber 1990; Wilkerson & White, 1988).

Case Western University's James Zull describes how information processes in the cortex of the brain (higher order thinking and conscious thought) by moving from sensory integration to conceptual integration and then to motor integration. This progression aligns remarkably well with Kolb's experiential learning model and with Bernice McCarthy's 4MAT model for teaching and learning. Most other common and currently popular teaching and learning models overlay and align with the 4MAT model. With concurrence among learning theorists and cognitivists, teachers can benefit in designing whole-person learning environments that include dynamic use of technology

Admittedly, not all courses are suitable for using PEDs as learning tools. Researchers recommend careful consideration in choosing ways to integrate PED technology into the curriculum to reinforce student learning. Well thought out policies and curricula (Zhu, Kaplan, Dershimer, & Bergom, 2010; Khalid, Chin, & Halten, n.d.) must be considered. PED use can be important, not only because of its popularity, but because its meaningful use can be a powerful tool to increase students' interest in learning.

5.2.2 For Students

This study sought the relationship between PED usage associated with learning styles and academic achievement. The study results can benefit students, for they can learn about how they process and perceive information through their own unique proclivities, especially in regard to their learning styles. Once students know more about their own learning tendencies, they can maximize their effectiveness in cognitive skills, perform better at school, and develop positive learning attitudes (Keefe, 1988). Another benefit for students is to help them realize how their time spent using PEDs is associated not with personal interest alone. Ways they use PEDs can be beneficial and they may directly and negatively impact on academic achievement. By wisely managing their time and purposes for PED use, they can realize maximum gain. This study's results suggest that when students use PEDs for educational purposes, this use has a positive correlation with higher academic achievement.

科技部補助計畫衍生研發成果推廣資料表

日期:2016/12/23

科技部補助計畫	計畫名稱: 調查學習型態和個人電子產品的使用及其對大學生在台灣學習成績之間的關係
	計畫主持人: 陳汝珊
	計畫編號: 104-2511-S-263-001- 學門領域: 應用科學教育

無研發成果推廣資料

104年度專題研究計畫成果彙整表

計畫主持人：陳汝珊	**計畫編號：**104-2511-S-263-001-
計畫名稱：調查學習型態和個人電子產品的使用及其對大學生在台灣學習成績之間的關係	

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			0	篇	
		研討會論文			0		尚在撰寫中
		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	0	人次	
		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。）					
	成果項目		量化		名稱或內容性質簡述
科教國合司計畫加填項目	測驗工具（含質性與量性）		0		
	課程/模組		0		
	電腦及網路系統或工具		0		
	教材		0		
	舉辦之活動/競賽		0		
	研討會/工作坊		0		尚在撰寫中
	電子報、網站		0		
	計畫成果推廣之參與（閱聽）人數		0		

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）
   本研究之學術成就，在於對學生的學習型態以及個人使用電子產品的使用目的對其學業成績之影響，有更深一層的理解。並且釐清了「工欲善其事，必先利其器」。在資訊日新月異的情況下，若將好的工具運在學習上，實際上是會提升學生的學習表現。例如此研究之結果即發現了，學生們若將個人使用電子產品使用在學習目的上，是有助其學業成績之提升。再者，若教學者能夠知道學生的學習型態是因人而異，即可幫助其在教學設計上，做更多元的設計，以符合不同學習者的學習需求。

4. 主要發現
   本研究具有政策應用參考價值：□否　■是，建議提供機關各大專校院
   （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）
   本研究之研究結果之一即發現了，學生們若將個人使用電子產品使用在學習目的上，有助其學業成績的提升。對未來之公眾利益及在，推及個人電子使用產品的「教育性」目的，以及如何設一系列兼具娛樂及教育目的學習app，以提升學生的學習表現。