# 科技部補助專題研究計畫成果報告
# 期末報告

## 中高齡女性成人網路學習互動歷程：平等覺受與知識建構（第 2 年）

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報 告 附 件 ： 出席國際會議研究心得報告及發表論文

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中　華　民　國　103 年 10 月 30 日

中 文 摘 要 ： 對於研究者及教學者而言，學習者在網路學習環境下的學習
本質是一個嶄新且重要的議題，而中高齡學習者尤其是女性
在網路學習環境下的學習更是需要資訊教育甚至是社會教育
研究者在未來更多的投入，以縮短台灣社會中年齡以及性別
上的數位落差。本研究原創「互動性平等覺受」
(Transactional perception on equality)之概念，發展量
表以及理論基礎，探討在合作學習環境下，平等覺受對於中
高齡學習者學習參與度及成效上的性別差異，並以質量並行
的研究方式，探討 Web2.0 自我建構之網路學習環境中，女性
學習者之平等覺受以及學習決定權的轉化在知識活動
(epistemological activities)上所扮演的角色。本研究之
目的為了解1. 「互動性平等覺受」對於中高齡學習者在網
路合作學習參與及成效的影響，並且探討中高齡女性學習者
之「互動性平等覺受」對學習成效之脈絡效果，以及探討合
作團隊組成型態(gender faultline)之調節效果。2. 另在部
落格的自我學習環境中探討中高齡女性學習者平等覺受對於
知識建構活動的影響，期能培養中高齡女性學習者自主、增
能、批判的學習能力，進而賦能。

中文關鍵詞： 網路學習、平等、互動、成人教育、知識建構

英 文 摘 要 ： The purpose of this study is to investigate the role
of "Transactional perception on equality (TE)" in
the relations to higher aged female learners'
Internet-based collaborative learning. TE, first
initiated by this study, refers to the perceptions of
learners received while interact with their peers,
instructors, course content, and learning media. The
more equal power the learners grant to themselves,
the better their participation. I try to identify the
group participation behavior and content by TE, which
reflects more directly to psychological drive. This
study also adopts gender faultline of groups to
examine the moderation role in the relationships
between TE and participation. The second study will
be conducted based on the findings of first study to
investigate the female learners' epistemology
activities on their own weblogs. TE will be
considered as a core in the relations to epistemology
activities. Qualitative and quantitative research
methods both applied to the studies. I hope the
research findings will contribute to the body of

knowledge on feminist pedagogy and learners'
behavior in online collaborative learning, and
empower female learners especially for higher aged
adults.

英文關鍵詞： Transactional equality, female adults, online
learning, epistemology activity

# 科技部補助專題研究計畫成果報告

## （□期中進度報告/■期末報告）

## 中高齡女性成人網路學習互動歷程：平等覺受與知識建構

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本計畫除繳交成果報告外，另含下列出國報告，共 _1__ 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

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中　華　民　國　103　年 10　月　23　日

# 科技部補助專題研究計畫成果報告自評表

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（簡要敘述成果是否有嚴重損及公共利益之發現）或其他有關價值等，作一綜合評估。

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    ■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：

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2. 研究成果在學術期刊發表或申請專利等情形：

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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），如已有嚴重損及公共利益之發現，請簡述可能損及之相關程度（以 500 字為限）

    本研究發現對於中高齡女性學習者的自我意義建構、轉化以及網路學習模式有具體成果，對於數位落差相對於弱勢的中高齡女性族群的學習特性，能提供具體建議之貢獻。

# 科技部補助國內專家學者出席國際學術會議報告

2013 年 6 月 17 日

| 報告人姓名 | 朱子君 | 服務機構及職稱 | 國立台北教育大學副教授 |
|---|---|---|---|
| 時間 | 102 年 6 月 17 日至 102 年 6 月 21 日止 | 本會核定補助文號 | NSC 101-2511-S-007-003-MY2 |
| 會議地點 | 奧地利 Bad Hofgastien | | |
| 會議名稱 | International Journal of Arts & Sciences (IJAS) conference for academic disciplines | | |
| 發表 | Chu, Regina Juchun; Chu, Anita Zichun, Tu, Yu-Ling, & Chiang, Chih-Ting | | |
| 論文題目 | Competences for engineers | | |

We presented our primitive research results in the conference regarding competences for engineers especially for App developers. During the conference event, we also attended in other presentations including posters. Because IJAS conference encourages young scholars and students study abroad, we met several international students and young scholars in the meeting from various research fields, not exclusive in education or vocational education. Less than perfection was that we bump into the flood in mid Europe, compared to other IJAS conference we attended before, participants were significantly reduced.

In addition to formal presentations, posters are the most popular form and easy to reach in the conference. Participants were from U.S., Thailand, Canada, Taiwan, British English etc., research fields also cover engineering, science, social science, economy and education. We learned a lot from interdisciplinary discussions and met new friends. We also got the chance to be published in IJAS after advanced review process if we want.

Abstract:

With the development of internet and smartphone, application stores, such as App Store、Google play, are fast-growing. Consequently, mobile software industry develops rapidly that makes the shortage of human resources of the industry. Many mobile software development companies have to face the shortage of high-quality of human resources. While recruiting, the employers cannot foresee the performance of the potential employees based on his/her knowledge of specialty. Therefore, this research tries to study the ability scale of the smartphone software engineers based on the study of Ibarra (2010) and others whose competency framework for smartphone software engineers are divided into three dimensions, including skills, social, and personal.
This study applies the Analytic Hierarchy Process (AHP) in the expert decision analysis. Participants of the survey are key experts in the related files, such as project managers and programmers. Most experts believe that the most important

ability in the mobile phone software development process is "social" that means the importance of relationship in the organization. The most five important indicators of abilities among all forty-four evaluation indicators are *leadership*, *ambition*, *to understand and follow the discussion*, *analysis*, *judgment and an extension of the pragmatic solution*. Project managers and programmers have different viewpoint on capacity indicators. The former think the actual ability to execute tasks is the most important one. The latter, however, more emphasize on the potential of the individual.

The purpose of this study would like to develop the competency framework for smartphone software engineers as the evaluation criteria for recruitment. The result of the survey could be applied as the reference for college plan of the teaching objectives in the related departments.

**Key words:** Competency, Analytic Hierarchy Process (AHP)



We brought back CD containing paper abstracts, Participation certificates.

# 研究成果

本計劃因為前計畫之延續，與本計劃內容相關之中高齡成人網路學習相關論文，已有一篇獲刊登於國際期刊，兩篇國際論文投稿中以及二篇國際研討會論文，茲分述如下：

1. Chu, R. J. (2014). Empowerment online: Feminist adult learning strategies. *Creative Education, 5*(3), 141-144.

2. Chu, R. J. (JCAL投稿準備中). The effects of perceived group equality to adult e-learning: a hierarchical linear modeling analysis.

3. Chu, R. J. (ETS投稿準備中). Gender differences in perceived equality and personal knowledge system development on personal learning network.

學術會議發表論文

1. Chu, R. J., & Chu, A. Z. (2014). Equality: The effects on self-directed learning readiness and learning satisfaction for adult learners. International Conference on New Horizons in Education, Paris, France, June 25-June 27, 2014.

2. 朱如君*、連玫雅、李施琳(2012). 中高齡資訊判準能力對網路醫學健康資訊使用態度之影響。GCCCE 2012 全球華人計算機教育應用大會，屏東墾丁， 2012 年 5 月 28 至 6 月 1 日。

# 研究結果報告

　　台灣漸入老化社會，而針對中高齡者使用網路提高學習成效及生活福祉的研究仍屬少數。筆者於過去五年的研究中嘗試探討中高齡者網路學習環境中之合作學習(Chu & Chu, 2010)、家庭影響因素及其網路學習成效之關係(Chu, 2010)，並探討中高齡學習者網路自我效能相關議題(Chu, 2010)、中高齡學習者之自我導向準備度在學習環境中的偏好(Chu & Tsai, 2009)以及轉化(Chu et al., 2011)有了初步的研究探究。本研究繼續探討在合作學習環境下，平等覺受對於中高齡學習者學習參與度及成效上的性別差異，並探討 Web2.0 自我建構之網路學習環境中，女性學習者之平等覺受以及學習決定權的轉化在知識活動(epistemological activities)上所扮演的角色。

　　女性主義學者認為，網路是一個脫離性別二元化以及性別界線的空間(Van Zoonen, 2002)，在其中可以解除社會脈絡的束縛，建立女性主義烏托邦(Morahan, 2000)。然而在網路世界匿名匿身份的特質中，也可能防害了更進一步瞭解性別角色在網路世界中所可能呈現的性別規範(gender norms). Chu(2010)研究中高齡網路學習也指出，年齡以及性別的差異，有著異曲同工的趨勢，表徵出弱勢者的學習特性。在此，我們不是要去躲避，而更要去面對真正的差異以及縮短網路世界中的權力落差，進一步對弱勢者，不論是女性或是年長者，提供增能的可能性。

　　本研究所原創的「互動性平等覺受」(transactional perception on equality, TE)概念源自於遠距教育自 1990 年以來廣為探討的互動性距離(transactional distance)。互動性距離由學者 Moore(1990,1993)提出，Moore 的距離是用學習活動中「對話」的量以及對話的架構來定義。針對這個定義，Saba 及 Shearer(1994)在他們的研究中也證實了師生間的相依性，並發現架構愈大，對話愈少，也就是距離愈遠。所以 Moore 認為學習者的自主性(autonomy)是縮短互動性距離很重要的因素。本人在成人網路學習環境中的相關研究(Chu, 2011; Chu & Tsai, 2009)，也證實了這個觀點，自我導向學習的準備度不但有助於基礎的認知上的學習，並更能解釋高層次的轉化。原本 Moore 的理論並不侷限於網路學習環境，互動性距離蓋指所有學習者的學習活動中所產生的對話量。Chen (2001)建立具信效度之測量工具，用來測量遠距教學環境中影響學習者表現的各項指標，並以「距離」這個名詞代表學習者在各項影響學習的因素中的表現。互動性距離提出四個面向說明在遠距教學環境中影響學習者表現以及其

滿意度：學習者間距離(learner-learner distance)、學習者-內容距離(learner-content distance)、學習者-界面距離(learner-interface distance)以及學習者-老師距離(learner-instructordistance)。回應到 Web2.0 學習環境中，Dron(2007)更提出 transactional control 的概念。質的探討很多，但架構很難具體。我認為在人為架構之前，學習者的參與更依賴社會脈絡中對學習者形塑的自我平等覺受，它更能反映出學習者參與自主學習的動機。觀察高等教育女性學習者，近年來的研究趨勢，性別差異愈來愈小，甚至有些學者認為性別差異不再是個大問題(Knight-Diop & Oesterreich, 2009)，故女性主義最近的發展漸注重性別與其他特質(demographic background)間的交互作用(Gomez, 2008; Newbery, 2009)，較不單純探討性別差異。而本研究的對象為中高齡學習者，合理的推論中高齡學習者之性別權力意識仍受傳統思想所圍限，故討論中高齡學習者之網路學習，性別仍是值得討論的議題。故本研究檢驗團隊成份對於互動性平等覺受、合作學習參與度以及網路學習成效的調節作用。

Fuller(1988)的社會知識論提出了四個評論以及一個問題，他認為：人類追求知識；每個人多多少少存在於一個已經被定義的知識體中；每個人的認知能力都不是完美的(cognitive development?)；每個人有著不同程度的途徑進入他人的知識活動中( what defines the access?)；基於上述假設，Fuller 便提出這樣的問題：如何有組織地追求知識？為回答這個問題，Zenios (2011)利用知識任務(Ohlesson, 1995)為架構，以質性研究方法探討網路社群上的知識建構過程。其研究非常重視合作學習特性對個人的知識建構影響。Ohlesson(1995)之知識任務架構明確地包含了七個知識論相關的任務：描述、解釋、預測、辯證、批判/評鑑、見解、以及定義。Morrison 及 Collins(1996)更針對合作提出知識流暢的概念讓知識得以結構化，目標化，規則化，以及策略化。在合作學習的概念下討論知識任務，Ohlesson 的架構是非常適合的(Goodyear & Zenios, 2007)。本研究即根據 Ohlesson 之知識任務架構發展女性部落客知識建構之知識活動。其後進一步探討這些女性學習者之平等覺受與知識活動間的互動關係。比如在教材知識平等覺受方面，本研究認為在女性得到較好的資訊判準能力，便能提升教材知識的平等覺受，進而挑戰批判知識，發展更為活耀的知識建構活動。而在對部落格回應方面，平等覺受的提升也會影響訊息互動的判斷。

故本研究之目的為了解 1. 平等覺受對於中高齡學習者在網路合作學習參與及成效的影

響，並且探討團隊組成對於中高齡女性學習者之平等覺受之作用。2. 另在部落格的自我學習環境中探討中高齡女性學習者平等覺受對於知識建構活動的影響，期能培養中高齡女性學習者自主、增能、批判的學習能力，進而賦能。研究架構如下：
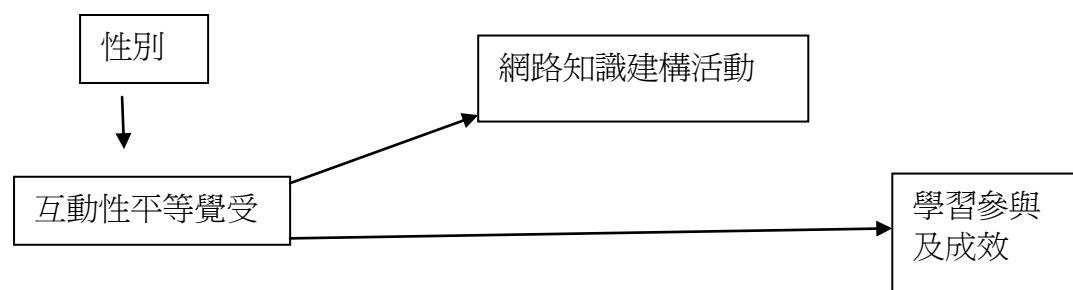


**研究方法**

　　本研究主要採調查研究法，利用問卷蒐集中高齡成人在網路學習上的互動以及學習成果等資料。以下就主要研究工具、資料分析策略、以及執行步驟及進度，一一說明。

1.1.數位學習成效

所有的問卷原則上皆採李克特式五點量表，檢視參與者在問題題項上的同意程度，5代表非常同意，1代表非常不同意。基於香港學者 Shin 及 Chan（2004）以及 Chu & Chu（2010)在遠距教育的研究，本研究採用其觀察數位學習成效的三個面向：知覺到的學習、繼續網路學習意願以及滿意度來檢測中高齡學習者的學習成效。

學習成果：指的是個人所知覺到在網路學習課程中認知上的獲得。這些成果包括關於智識上的發展，也包括網路合作學習過程中的過程知識之取得。原始量表包括10題，其信度為.89，堪稱良好。例句包括：「我學到生活中很實務的知識」；及「這個網路學習讓我增將了學習能力」。

繼續網路學習意願：指的是學習者繼續註冊或選擇網路學習的傾向。原始量表包括4個題項，信度為.63，尚可接受。題項例句包括：「我下學期會註冊網路學習

的課程」；以及「我會盡量克服在網路學習課程中遭遇到的困難。」

滿意度：指的是對於網路學習整體上的正面評價。原始量表包含 6 個題項，內部

一致性係數為.84，堪稱良好。題項包括：「選擇這個網路學習課程對我來說是

個很有價值的經驗」；以及「我喜歡網路學習課程」。

## 1.2. 互動性平等覺受 (Transactional Perception on Equality, TE)

因此概念為本研究所原創，故為自編量表。「互動性平等覺受量表」基於 Chen 互動性平等覺受網路知識活動(2001) 所提出之遠距教育之互動性距離四個概念所衍伸。補足 Chen 之測量工具，用來測量中高齡學習者在合作環境中自身對於 1)同儕；2)教師；3)教材知識；4)學習工具所覺知之可控制程度以及對應感受到的相對權力。本研究進一步基於測量結果進行性別分析，檢視中高齡女性學習者在網路學習環境中權力平等覺受以及其與合作學習參與度的關係。這個量表主要測量學習者感受團體中本身相對於同儕、相對於教師、相對於教材知識、以及相對於學習工具的權力。舉例來說，同儕間的互動性平等覺受題項包括：「面對組上同學，我覺得我有跟別人同等的發言權。」；「小組同學的討論過程應該每個人機會均等。」等等來測量中高齡學習者在學習歷程中對於權力平等的覺受。教師的互動性平等覺受題項包括：「我覺得老師將我們當作可以獨立決策的個人。」、「我覺得我與老師有一樣的權力決定課堂的所有學習任務進行方式。」等用來反應中高齡學習者對於學習環境中教師權威的態度以及自身權力的知覺程度。教材知識平等覺受題項包括：「我認為課堂上所指定的教科書寫的都是對的，無須懷疑。」、「我認為網路搜尋的知識正確性是值得商榷的。〈反向〉」、「我覺得我可以挑戰現有知識。」等測量中高齡學習者之批判知識以及轉化增能之能力。學習工具之平等覺受與網路/電腦自我效能內涵類似，題項包括：「我覺得我可以成功操作遠距教學所使用的學習介面。」所有題項平均數愈高，表示其感受的平等程度愈高，反之亦然。預期這個量表對於中高齡學習者之參與學習活動以及從事知識活動(epistemological activities)之動機，會有比較高的解釋力。此外，也同時改善 Chen (2004)量表趨向以滿意度表示距離，而無法反映出心理上的權力距離。

## 研究結果

　　第一個研究主軸包括平等覺受與學習活動策略研究，本研究成果已建立評等覺受量表以及網路知識建構量表。首先，針對成人於網路合作學習環境中所感知之平等覺受，建立評量

量表。用以分析集體主義文化下之團隊對個人學習之影響。量表摘要如下文所示：

# Empowerment online: Feminist adult learning strategies

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The purpose of this is to investigate how adult female learners constitute their perceptions of self and learning behavior in an internet learning environment – weblog. Based on previous qualitative research method and literature review, this study intended to develop and validate a feminist adult learning strategy scale (FALSS) to understand the women's learning strategy by applying weblogs. 417 valid data from the participants in two studies (exploratory and confirmatory factor analysis) were analyzed for the purpose. The results of these studies supported a 15-item, 4-factor FALSS: Empowerment Attempt, Sharing Experiences, Participatory Learning, and Critical Thinking and Open-mindedness.

*Keywords*: Online learning, Adult learning, Feminist education

# Introduction

Weblogs(blogs) have recently drawn considerable attention as a new form of communication. Since the late 1990s, blogs have become a growing phenomenon. There were only 30,000 bloggers in 1998 (Amis, 2002). Recent survey found that the number of blog readers has skyrocketed to about 94 million American adults and that about half of Internet users read blog content (Technorati, 2008).

With the advent of Web2.0 technology, weblogs provided alterative media for individual learning and teaching. Apart from traditional education system, personal weblogs are more self-directed free from the space and time limit of class meeting. The asynchrony interactions of friends and self-initiated personal portfolio organized by the learners enable the social construct and transformation for the users. This student-centered learning environment (Gomaz, 2008) allows learners to actively reflect, organize and construct their own learning and theories especially for women. Women may possibly express themselves without restrictions of patriarchy structures derived from classroom interactions, texts, and knowledge contents (Hughes, 1995; Tisdell, 1993). However, a web-based feminist learning experience such as online discussion, self-expression, digital poster group, and weblogs may play another learning opportunity, and further develop female learners' leadership (Littlefield & Roberson, 2005) and their transformation(Chu et al., 2012). Kelly, Pomerantz, & Currie, (2006) also found that young female learners will develop effective learning and survival strategies in this environment. Therefore, the purpose of this study is to develop and validate a scale that measures the learning strategies used by adult women when using weblogs.

Feminist education or called feminist pedagogy was introduced in 1980s. Feminist education starting from feminism challenges the knowledge and theories deducted from traditional Western cocasion male elites (Bunch, 1981, 2000). Feminist educators concern more about the history, experience and relationships, the way of knowing (Belenky, Clinchy, Golderberg, & Tarule, 1986) that create a new identity of women.

Tisdell (1988) categorized three models of feminist education based on the study of Masher (1987): psychological models, structural models and postructural model. Psychological model developed based from literal feminism and psychiatry analysis. This model concerns the psychological needs of female learners; stresses the importance of gender need differences in learning environments and relationships. The model highlights individual caring and empowerment. The means to reach the goal of empowerment is by voice up, expressing and listening to herself. Structural model emphasizes the power structure and the nature of relationships. This model was derived from criticism and structural feminism. Relative to patriarchy structure, this feminist model take women as the oppressed who need to be emancipated. Post- structural model was influenced by post modernism and post structural feminism stressing the relationships of power and identity. This model asserted that it is not enough to focus on structure, they need to understand the position. Positionality is the core of the model. The main issues of adult learning, then, are positionality, knowledge construction, voice up and power.

## Purpose of the Study

The purpose of this study is to develop and validate a Feminist Adult Learning Strategy Scale (FALSS) for measuring the learning style and strategy used for women when they are writing and maintain their own weblogs. The results of this research will contribute to the study of adult self-directed learning studies to see how women transform and reposition themselves under a patriarchy society.

## Method

### Study 1: Pilot Test

### Data Collection

This study was based on feminist education for assessing women bloggers among Internet users.

The data were collected from an online survey to attract female blog writers. This study applied a purposive sample to target Internet users who are going online for writing journals on weblogs on a daily base.

In order to draw female webloggers with a wide range of viewpoints, notices of the survey were posted on a wide range of Web sites, such as personal blogs, online discussion groups, and chat rooms. Defined as blogs dedicated to personal journal writing, commentaries, and analyses, a total of 200 female blog writers were selected. Survey responses were returned as data files, containing the data and time of receipt as well as the respondents' Internet survey addresses. Internet server and e-mail addresses were used to remove duplicate responses. A total of 182 female adult bloggers participated in this study and fill out the survey on line.

**Participants**

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**Item Generation**

The process of item generation began with consulting the literature and empirical studies that examined indicators of feminist learning strategies and styles of women bloggers or blog readers rooted from feminist education theories. From the above literature review and prior qualitative

studies, indicators could be groups into four categories: (a) empowerment attempt; (b) sharing experiences; (c) participatory learning; and (c) critical thinking and open-minded. A search for appropriate items was made from available sources that contained items to measure some or all of the above constructs, and they included bloggers as participants.

A list of 28 items was generated by the authors, all of which are university faculty members with earned PhDs in related disciplines. An important consideration at the item generation stage was to ensure that the items could be understood by the potential respondents. For this reason, focus group interviews with bloggers were conducted to determine the appropriateness of each item. In total, we conducted two focus group discussions, each with 6 and 7 individual bloggers. Based on the suggestions and recommendations given by the participants from the focus groups, the items were revised to achieve face validity, clarity in language, and parsimony in scale length. Moreover, focus group members were also based on their experience to generate some more items for the pilot. The focus group discussions resulted in the total number of items being reduced from 28 to 20 at this stage.

**Data Analysis**

Factor analysis was run to identify the learning strategies for women with their blogs. The 20 statements were factored by principal component analysis (PCA) with varimax rotation (orthogonal), which assigned the items to a specific factor when the primary loadings were greater than .50.

**Result**

An exploratory factor analysis (EFA) using PCA with varimax rotation was conducted on the 20 items to explore the underlying structure of the scale. The criteria for determining the number of components to retain were Kaiswer's (1960) eigenvalue greater than 1 and Cattell's (1966) scree test. The initial solution yielded four components with eigenvalues exceeding 1, accounting for a total of 63.58% of the variance. Inspection of the scree plot supported the retention of four

components as well. Following the recommendations by Hair, Black, Babin and Anderson (2010), items with loadings greater than .50 have practical significance. On this basis, 15 of the 20 items were retained for further analysis. At this stage, the four factors were empowerment attempt (EA, 4 items), sharing experiences (SE, 4 items), participatory learning (PL, 4 items), critical thinking and open-mindedness (CO, 3 items). To provide further checks on the factor structure, a principal axis factor analysis with orthogonal and oblique rotations (direct oblimin: delta = 0, promax: kappa = 4) were conducted on the four-factor solution and these yielded consistent results. The descriptive statistical analyses show that the mean scores of all 15 items ranged from 3.21 to 4.22. The standard deviations ranged from 0.52 to 0.97 and the skew and kurtosis indices from -0.78 to 0.23 and -0.79 to 1.74 respectively. Following Kline's (2005) recommendations, the data in this study were considered to be univariate normal (Table 1).Table 2 shows the varimax rotated solution and the results of the principal component analysis of the 15-item, 4-factor scale. Based on a literature review of typologies of feminist pedagogy studies, and sophisticated statistical analyses, general definitions of the four learning strategies for women bloggers in this study are as follows:

(1) Empowerment Attempt: Users have the attempt to pursue personal control and decision making authority.

(2) Sharing experiences: Using blogs to share life experiences for personal use and discussions with others.

(3) Participatory learning: Actively connect and construct personal knowledge by organize personal portfolio and discussing with learning peers.

(4) Critical thinking and open-mindedness: Users conduct critical reflection on her own works and opinions provided by others.

**Table 1.**

Descriptive of the 15 items proposed for the FALSS

| Item | Mean | SD | Skewness | Kurtosis | Range |
|------|------|------|----------|----------|-------|
| EA1 | 3.80 | 0.72 | -.67 | .67 | 2-5 |
| EA2 | 3.74 | 0.85 | -.33 | -.42 | 2-5 |
| EA3 | 3.74 | 0.76 | -.55 | .24 | 2-5 |
| EA4 | 3.21 | 0.81 | -.15 | -.30 | 1-5 |
| SE1 | 4.15 | 0.58 | -.42 | 1.74 | 2-5 |

| | | | | | |
|---|---|---|---|---|---|
| SE2 | 4.12 | 0.58 | -.15 | .45 | 2-5 |
| SE3 | 4.21 | 0.62 | -.16 | -.53 | 3-5 |
| SE4 | 4.14 | 0.56 | -.12 | .63 | 2-5 |
| PL1 | 4.18 | 0.52 | .23 | .23 | 3-5 |
| PL2 | 4.18 | 0.59 | -.44 | 1.51 | 2-5 |
| PL3 | 4.11 | 0.61 | -.29 | .63 | 2-5 |
| PL4 | 4.22 | 0.56 | -.14 | .48 | 2-5 |
| CO1 | 3.64 | 0.72 | -.28 | .34 | 1-5 |
| CO2 | 3.27 | 0.97 | -.24 | -.79 | 1-5 |
| CO3 | 3.68 | 0.89 | -.78 | .60 | 1-5 |

**Table 2.**

Rotated factor loadings, Cronbach's alpha and eigenvalues for the four factors of FALSS[a]

| Item | EA | SE | PL | CO |
|---|---|---|---|---|
| Factor 1: Empowerment Attempt (EA) | | | | |
| α =0 .67 | | | | |
| eigenvalue = 13.68 | | | | |
| I have the power to decide who has the access to my blog. | .82 | | | |
| I decide what to put on my personal journals. | .79 | | | |
| I feel I have the power in influencing people. | .79 | | | |
| I construct my own theory for my life. | .65 | | | |
| Factor 2: Sharing Experiences (SE) | | | | |
| α =0 .74 | | | | |
| eigenvalue =22.07 | | | | |
| I write journals to let my friends know what happens to me. | | .80 | | |
| I share my opinions through my blog. | | .78 | | |
| I share my photos by my blog. | | .56 | | |
| I share my network with common interests through my blog. | | .52 | | |
| Factor 3: Participatory Learning (PL) | | | | |
| α =0 .89 | | | | |
| eigenvalue = 15.55 | | | | |
| I learn new ideas when | | | .81 | |

| | |
|---|---|
| discussing with my friends. | |
| I organize what to portray on my blog. | .81 |
| I compare and reconstruct the information from blog connections. | .80 |
| I demonstrate the work I have done on my blog. | .74 |

Factor 4: Critical Thinking
and
Open-Mindedness
(EA)
α =0 .86

eigenvalue = 12.78

| | |
|---|---|
| I reflect what I have been from my journals. | .65 |
| I rethink what I can do better by going through my blog journals. | .62 |
| I criticize other's opinions before I accept them. | .57 |

[a]The scale internal consistency reaches .88.


**Study 2: Validation**


**Participants**


   The purpose of this study is to assess the factorial validity of the 15-item FALSS. Participants in this study were 235 female bloggers in Taiwan. The mean age of the participants was 30.77 (SD = 5.21). The sample comprised 143 (60.85%) active female blog writers. All participants were volunteers and were not grant by extra points for grade or monetary reward.


**Confirmatory Factor Analysis**


   The confirmatory factor analysis (CFA) of this study was used to examine the factorial structure of the 15-item scale and LISREL 8.8 was employed as the computer software for the analysis. The model examined in this study was tested using maximum likelihood estimation (ML). The model fit

assessed by six indices: $\chi^2$, as the $\chi^2$ is sensitive to sample size, the ratio of $\chi^2$ to its degree of freedom ($\chi^2/df$) was used, with a recommended value smaller than 5.0. (Hu & Bentler, 1999). Two absolute fit indices are reported as the standardized root mean square residual (SRMR) with a recommended value smaller than .05; and the root mean square error of approximation (RMSEA) with values less than .08 as acceptable fit (MacCallum, Browne, & Sugawara, 1996). Finally, the comparative fit index (CFI) and non-normed fit indix (NNFI) with a recommended value larger than .95 (Hu & Bentler, 1999) to indicate an acceptable level of model fit.

**Results**

The model fit of the facto model reveals a good model fit ($\chi^2$ = 234.62, df = 84; $\chi^2/df$ = 2.79; NNFI = .98; GFI = .95; RMSEA = .067; SRMR = .039). As each indicator was specified to load on just one latent variable in the model, the standardized estimates were regarded as structure coefficients that estimate indicator-construct correlations (Kline, 2005).

For the good model fit indices, composite reliability and average variance extracted reach the acceptable level, which provided support for convergent validity (Maruyama, 1998).The inter-factor correlations (Φ) are between .54 to .69, all smaller than the square root of AVE of each construct, indicating a good discriminant validity. In addition, all standardized estimates had exceeded the recommended value of 0.50 (Hair et al., 2010). The Cronbach's alpha for the instrument is .88 and the α for the four subscale are .67, .74, .89, .86 respectively. The factor loading coefficients, t-value for each item and composite reliability, average variance extracted of each construct are shown in Table 3.

**Table 3.**

Factor loading coefficients, t-value, CR and AVE of FALSS

| Item | λ | t-value | CR[a] | AVE[b] |
| --- | --- | --- | --- | --- |
| EA1 | .52 | 6.44 | .73 | .51 |

| | | | | |
|-----|-----|-------|-----|-----|
| EA2 | .59 | 6.91  |     |     |
| EA3 | .66 | 9.27  |     |     |
| EA4 | .77 | 10.48 |     |     |
| SE1 | .64 | 11.57 | .77 | .62 |
| SE2 | .75 | 9.63  |     |     |
| SE3 | .71 | 10.88 |     |     |
| SE4 | .60 | 8.32  |     |     |
| PL1 | .80 | 14.16 | .90 | .68 |
| PL2 | .85 | 15.75 |     |     |
| PL3 | .85 | 14.16 |     |     |
| PL4 | .80 | 15.59 |     |     |
| CO1 | .71 | 10.12 | .86 | .67 |
| CO2 | .90 | 15.79 |     |     |
| CO3 | .84 | 14.39 |     |     |

[a]CR refers to the composite reliability, recommended value is > .70.

[b]AVE refers to the average variance extracted, recommended value is > .50

**Discussion and Conclusion**

The factor structure of the FALSS was validated in this study. The four dimensions of how

women learn on their own personal weblogs are: empowerment attempt, sharing experiences, participatory learning, and critical thinking and open-mindedness. The result was derived from a sample comprised participants mainly from Taiwan. From the view of diversity, the result may provide a start for the future studies applying in different culture and ethnic groups. For this sample, critical thinking was scored the lowest while participatory learning scored the highest. It echoes the finding of collectivism that Eastern culture value higher on the relationships rather than criticism (Chu & Chu, 2010). This scale will contribute the knowledge of adult online learning by combining other adult learning strategies such as self-directed learning readiness, collaborative learning, and their epistemological development to move their comfortable space of knowing to uncomfortable places of becoming (Philips, Harris, Larson, & Higgins, 2009).

## Acknowledgements

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而第二個研究主軸包括評等覺受與網路知識建構活動之研究，首先，知識建構活動量表之建構後並檢驗評等覺受之性別差異以及建構研究模型，內容如下（摘自本人預計投至 Educational Technology & Society 之論文）：

## Gender differences in perceived equality and personal knowledge system development on personal learning network

### ABSTRACT

The purpose of this research is to investigate how personal learning network (PLN) facilitates individuals to build up their own epistemologies of the interpretation for their knowledge system. Based on three interviews and literature reviews, this study intends to develop and validate a personal epistemology development scale (PEDS) on PLNs to understand learner knowledge constructions. 561 valid data from the participants in two studies (exploratory and confirmatory factor analysis) were analyzed for the research purpose. The results of these studies supported an 18-item, 4-factor PEDS: description, analysis, vision, and strategy. The results also reveal that equality significantly influences the process of theory development especially for the stage of vision. The result moreover shows gender differences exist in the perception of equality on PLN environment, in the description and in the vision stages.

**Keywords**: Personal Learning Network, Adult learning, Constructivism

## 1. Introduction

A **personal learning network** is an informal learning network that consists of the people a learner interacts with and derives knowledge from in a personal learning environment. In a PLN, a

person makes a connection with another person with the specific intent that some type of learning will occur because of that connection. An important part of this concept is the theory of connectivism developed by George Siemens and Stephen Downes. Learners create connections and develop a network that contributes to their professional development and knowledge. Personal Learning Networks (PLNs) are all about using web tools such as blogs, wiki, twitter, facebook to create connects with others which extend our learning, increases our reflection while enabling us to learn together as part of a global community. PLNs increase our opportunities to ask questions and receive help compared to our normal daily face-to-face interactions.

American Activist Cholette Bunch (2000) asserts that to promote the power of minority, ethnic or gender, reading and writing are important channels to start with. She provides a concept of personal theory construction for learners to emphasize their own power and transformation into actions. Only the very specific individual can explain what they have done and must been done (Tisdell, 1998). The disadvantaged groups should learn how to build their own theory rather than accept the dominant value of the oppressors.

PLNs (PLN ) has been introduced for these past decade (Amis, 2002). People use it as journal writing, sharing experiences, showing off achievements, connecting with friends and community, even for commercial use. Writing is a basic form of PLNs (Technorati, 2008). Since writing and readings can help individual construct their own theories, this study intends to explore the activities on the personal PLNs to examine the impact of the interactions between individual to peers and context to construct their own theory.

## 1.1 Personal Epistemology Development

Kerlinger (1986) has defined theory as a set of interrelated concepts, definitions and propositions of phenomena put together with a systematic view of interrelations with the purpose of describing, explaining or predicting the phenomenon. Theory, in another word, is a bond between facts with fact assimilations (Seley, 1964). As to personal epistemology development, it refers to the

organization or arrangement of the interrelation of parts to give from to the entity or phenomenon. Its process elements include: ideas, creativity, discipline of imagination, logic, methods and procedures, and standards of conduct. When review the elements, people would think a theory construction must be implemented by a trained or knowledgeable scholar. Bunch and Frost (2000) asserted that every single individual has the ability and the right to construct theories. The construction is not privileged to scholars. The activist stresses that the power to define oneself and explain the experiences of his/her context should be enhanced and respected especially for ethnic minority, females, and sociostructure disadvantaged group. Bunch (1981), Bunch and Frost (2000) provide four stages for personal epistemology construction: description, analysis, vision and strategy. These stages are the frame for the observation of this study on the work of PLN writings.

## 1.2 Equality

The perception of equality for PLN users is important to their learning decisions. Bunch (1981), Bunch and Frost (2000) think only through the enhancement of perceptions of equality of individual's relationships with others, the possibility of personal theory development can be realized. The equality includes the equal power between teachers and students, student peers, feminist equality, and the equal power between readers and their readings (Hayes, 1989). The assumption is that when people raise their power and dialogue with the knowledge source, instead of completely acceptance, then it is possible for the individual to develop his/her own belief and then transform.

## 1.3 Purpose of the study

The purpose of this study is to develop and validate a personal epistemology development scale (PEDS) with the PLNs. This research also intends to explore the relationship between perceived equality to the stages of theory construction. Gender differences between female and male PLN writers in their personal theory/epistemology development and perceived equality will be discussed in this paper.

## 2. Method

### 2.1 Study 1: Pilot Test

### 2.1.1 Data Collection

This study assesses PLN users' perceived power relations existing in their personal PLN for their own personal theory making. The data were collected from an online survey. This study applied a purposive sample to target Internet users who are going online for writing journals on PLNs on a daily basis. A total of 600 PLN s were selected. Survey responses were returned as data files, containing the data and time of receipt as well as the respondents' Internet survey addresses. Internet server and e-mail addresses were used to remove duplicate responses. A total of 561 PLN users participated in this study and fill out the survey on line.

### 2.1.2 Participants

For pilot test, 150 PLN writers were included. All participants were invited to volunteer. The mean age of the participants were 30.17 (SD = 7.68) and there were 76 (50.67%) male. The gender ratio was even in this pilot study. Respondents on average have used the Internet for more than 9 years, spending an average of 24.17 hours per week with the Internet related activities and 15.24 hours a week on writing their own PLN s or browsing PLN s.

### 2.1.3 Data Analysis

This study tested and refined the survey items proposed for the scale. These items were presented by a 5-point Likert type scale with 1=strongly disagree and 5= strongly agree. Factor analysis was run to identify the theory construction stages for PLN users. 19 statements were developed from interviews and used for factored by principal component analysis (PCA) with varimax rotation (orthogonal), which assigned the items to a specific factor when the primary loadings were greater than .50.

**2.1.4 Results**

An exploratory factor analysis (EFA) using PCA with varimax rotation was administered on the 19 items to explore the underlying structure of the scale. The criteria for determining the number of components to retain were Kaiswer's (1960) eigenvalue greater than 1. The initial solution yielded four components with eigenvalues exceeding 1, accounting for a total of 65.59% of the variance. Following the recommendations by Hair, Black, Babin and Anderson (2010), items with loadings greater than .50 have practical significance. On this basis, all 19 items were retained for further analysis. At this stage, the four factors were description (DE, 6 items), analysis (AN, 4 items), vision (VI, 6 items), strategy (ST, 3 items), accordant with the original theory. The descriptive statistical analyses show that the mean scores of all 19 items ranged from 3.52 to 4.30. The standard deviations ranged from 0.51 to 0.74 and the skew and kurtosis indices from -0.40 to 0.30 and -0.56 to 1.08 respectively. Following Kline's (2005) recommendations, the data in this study were considered to be univariate normal (Table 1).Table 2 shows the varimax rotated solution and the results of the principal component analysis of the 19-item, 4-factor scale.

Based on a literature review of typologies of personal epistemology development, and sophisticated statistical analyses, general definitions of the four theory forming stages for PLN users in this study are as follows:

(5) Description: Users write and describe what they experiences; and read what others' opinions.

(6) Analysis: Theory constructors compare their own ideas; and compare different sources of information.

(7) Vision: PLN users develop the impacts of their beliefs.

(8) Strategy development: Detailed steps of implementing their theories; and reach a transformation by PLN journal writings.

Table 1 Descriptive of the 19 items proposed for the PEDS

| Item | Mean | SD | Skewness | Kurtosis | Range |
| --- | --- | --- | --- | --- | --- |

| | | | | | |
|-----|------|------|------|------|-----|
| DE1 | 4.30 | 0.58 | -.29 | .15  | 2-5 |
| DE2 | 4.20 | 0.55 | .05  | -.16 | 3-5 |
| DE3 | 4.18 | 0.59 | -.32 | .80  | 2-5 |
| DE4 | 4.28 | 0.51 | .30  | -.52 | 3-5 |
| DE5 | 4.20 | 0.57 | -.16 | .40  | 2-5 |
| DE6 | 4.09 | 0.61 | -.40 | 1.08 | 2-5 |
| AN1 | 3.52 | 0.74 | .02  | -.30 | 2-5 |
| AN2 | 3.60 | 0.66 | -.09 | -.16 | 2-5 |
| AN3 | 3.61 | 0.63 | -.31 | -.04 | 2-5 |
| AN4 | 3.68 | 0.65 | -.05 | -.17 | 2-5 |
| VI1 | 3.72 | 0.74 | -.22 | .20  | 1-5 |
| VI2 | 3.71 | 0.72 | -.40 | .50  | 1-5 |
| VI3 | 3.83 | 0.72 | -.30 | .45  | 1-5 |
| VI4 | 3.77 | 0.67 | -.36 | .26  | 2-5 |
| VI5 | 3.79 | 0.70 | .09  | -.56 | 2-5 |
| VI6 | 3.53 | 0.64 | .15  | -.25 | 2-5 |
| ST1 | 3.59 | 0.72 | -.37 | .30  | 1-5 |
| ST2 | 3.86 | 0.71 | -.16 | -.25 | 2-5 |
| ST3 | 3.57 | 0.72 | -.33 | -.13 | 2-5 |

## 2.2 Study 2: Validation

### 2.2.1 Participants

The purpose of this study is to validate the factor analysis result of the 19-item PEDS. Participants in this study were 411 PLN users in Taiwan. The mean age of the participants was 28.96 (SD = 8.12). The sample comprised 235 (57.18%) female PLN users. All participants were volunteers and were not grant by extra points for grade or monetary reward.

## 2.2.2 Confirmatory Factor Analysis

The confirmatory factor analysis (CFA) of this study was used to validate the factorial structure of the 19-item scale by the computer software LISREL 8.8. The model examined in this study was examined using maximum likelihood estimation (ML). The model fit assessed by six indices: $\chi^2$, as the $\chi^2$ is sensitive to sample size, the ratio of $\chi^2$ to its degree of freedom ($\chi^2/df$) was used, with a recommended value smaller than 5.0. (Hu & Bentler, 1999). Two absolute fit indices are reported as the standardized root mean square residual (SRMR) with a recommended value smaller than .05; and the root mean square error of approximation (RMSEA) with values less than .08 as acceptable fit (MacCallum, Browne, & Sugawara, 1996). Finally, the comparative fit index (CFI) and non-normed fit index (NNFI) with a recommended value larger than .95 (Hu & Bentler, 1999) to indicate an acceptable level of model fit.

Table 2 Rotated factor loadings, Cronbach's alpha and eigenvalues for the four factors of PEDS[a]

| Item | DE | AN | VI | ST |
|---|---|---|---|---|
| **Factor 1: Description (DE)** | | | | |
| α =0 .90 eigenvalue = 7.66 | | | | |
| I like to write down what happened with my life. | .807 | | | |
| I can write details about my experiences. | .795 | | | |
| I know how to organize my PLN journals. | .791 | | | |
| I read carefully about other's commends. | .768 | | | |
| I feel it right to put on my knowledge on PLN. | .718 | | | |
| Writing journals are important for me to record my life experiences. | .710 | | | |
| **Factor 1: Analysis (AL)** | | | | |
| α =0 .86 eigenvalue =2.32 | | | | |
| I know why I flag the opinions on my PLN s. | | .797 | | |
| I compare different ideas of my own. | | .769 | | |
| I compare other's commends with my opinions. | | .764 | | |
| I try to figure out why people think differently. | | .758 | | |
| **Factor 1: Vision (VI)** | | | | |
| α =0 .83 eigenvalue = 1.39 | | | | |
| I feel I can apply what I believe in the real life. | | | .795 | |
| Some principles of mine are consistent. | | | .704 | |
| The journals I wrote have impact on other's opinions. | | | .697 | |
| The theories I develop explain well on my actions. | | | .614 | |
| I know I can improve the world. | | | .559 | |
| **Factor 1: Strategy (ST)** | | | | |
| α =0 .71 eigenvalue = 1.09 | | | | |

| | | | | | |
|---|---|---|---|---|---|
| I develop the steps to reach my goals. | | | | | .866 |
| I develop details to reflect on my PLN journals. | | | | | .670 |
| I had transformation experience on my journal writing experiences. | | | | | .511 |

[a]The scale internal consistency reaches .91.


## 2.2.3 Results

The model fit of the factor model indicated a good model fit ($\chi^2$ = 258.55, $df$ = 129; $\chi^2/df$ = 2; NNFI = .97; GFI = .97; RMSEA = .081; SRMR = .056). One item was erased (original VI4) while the $\lambda$ was too low (.42). With the good model fit indices, acceptable composite reliability and average variance extracted, this study provided support for convergent validity (Maruyama, 1998).The inter-factor correlations ($\Phi$) are between .50 to .73, all smaller than the square root of AVE of each construct, indicating a good discriminant validity. In addition, all standardized estimates had exceeded the recommended value of 0.50 (Hair et al., 2010). The Cronbach's alpha for the instrument is .91 and the $\alpha$ for the four subscale are .90, .86, .83, .71 respectively. The factor loading coefficients, t-value for each item and composite reliability, average variance extracted of each construct are shown in Table 3.

Table 3 Factor loading coefficients, t-value, CR and AVE of PEDS

| Item | $\lambda$ | t-value | CR[a] | AVE[b] |
|---|---|---|---|---|
| DE1 | .82 | 12.18 | .90 | .59 |
| DE2 | .81 | 14.51 | | |
| DE3 | .81 | 14.58 | | |
| DE4 | .72 | 11.11 | | |
| DE5 | .78 | 14.89 | | |
| DE6 | .66 | 13.88 | | |
| AN1 | .74 | 15.34 | .86 | .62 |
| AN2 | .83 | 14.81 | | |

| | | | | |
|---|---|---|---|---|
| AN3 | .72 | 12.50 | | |
| AN4 | .84 | 11.97 | | |
| VI1 | .72 | 11.70 | .83 | .50 |
| VI2 | .72 | 10.37 | | |
| VI3 | .74 | 11.95 | | |
| VI4 | .71 | 12.11 | | |
| VI5 | .64 | 12.39 | | |
| ST1 | .84 | 7.82 | .80 | .57 |
| ST2 | .75 | 11.52 | | |
| ST3 | .67 | 10.09 | | |

[a]CR refers to the composite reliability, recommended value is > .70.

[b]AVE refers to the average variance extracted, recommended value is > .50

## 3. Hypothesis Analysis

### 3.1 Gender differences

In addition to the PEDS, this survey also ask participant of how they perceive the equality of their learning environment. The questions items are: "I feel I have the equal power with the peers who give comments"; and "I accept the knowledge which has been posted on the Internet". This study first performed a t-test on the set of predictor and criterion variables, finding significant ($p<.001$) omnibus difference between gender on descript, vision and perceived equality ($t = 5.21$, 2.21, and 6.45 respectively) as shown in Table 4, female PLN users reported significantly ($p<.05$) higher description and vision, but perceived lower equality from their learning context and knowledge content. Scale means, standard deviations, and intercorrelations for the full sample are reported in Table 5.

Table 4 Variables as a Function of PLN users' Gender

| | Women | Men |
|---|---|---|

| Variable | M(SD) | M(SD) | t |
|---|---|---|---|
| | (n=235) | (n=176) | |
| Description | 4.25(0.48) | 4.18(0.43) | 5.21** |
| Analysis | 3.72(0.55) | 3.68(0.57) | 1.06 |
| Vision | 3.81(0.49) | 3.58(0.52) | 2.21* |
| Strategy | 3.09(0.56) | 3.16(0.59) | 0.98 |
| Equality | 3.06(0.84) | 3.74(0.70) | 6.45** |

$p < .05$; ** $p < .01$.

Table 5 Scale means, standard deviations, and intercorrelations for all variables

| Variables | M | SD | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|---|---|
| 1. Description | 4.21 | .46 | .90 | | | | |
| 2. Analysis | 3.60 | .56 | .44** | .86 | | | |
| 3. Vision | 3.71 | .54 | .43** | .63** | .83 | | |
| 4. Strategy | 3.11 | .57 | .51** | .39** | .49** | .71 | |
| 5. Equality | 3.39 | .72 | .40** | .35** | .30** | .21** | .69 |

$p < .05$; ** $p < .01$.

Note: the diagonal represents variable constructs' internal consistence.

## 3.2 Measurement and Structure Model Analysis

The measurement model produced good fit to the data: CFI = .97 , NNFI = .96, SRMR = .059 , RMSEA = .07, $\chi^2$ (160) = 341.20, $p < .001$, $\chi^2/df$ = 2.13.   We next tested the fit of the structural

model. Analysis of the structural model yielded evidence of good fit: CFI = .96 , NNFI = .96, SRMR = .070 , RMSEA = .078, $\chi^2$ = 398.53, $p$ < .001, $df$ = 166, $\chi^2/df$ = 2.40. The structural model did not fit the data as well as the measurement model, $\Delta\chi^2(6)$ = 57.33, $p$ < .001, suggesting the measurement model does not fully explain the relations among the factors.

As shown in Figure 1, this study found support for the specific predictions that the perceived equality contribute to the prediction of each stages of theory construction. Equality accounted for 51% of the description, 59% of the analysis, 67% of the vision, and 61% of the strategy, respectively.

## 4. Discussion and conclusion

The factor structure of the PEDS was validated in this study. The four stages of how people construct their personal theory on their own PLNs are: description, analysis, vision and strategy. This study also reveals that perceived equality in PLN environment also positively impact the stages of theory construction especially for the vision. Vision needs imagination and implementation. The perception of power equality can promote the vision stage posted once the individual feel unconstrained in their thoughts. The result also demonstrated gender difference in perceived equality, description and vision. Female writers may feel less equal toward the comments and existing information presented to them. This reflects the inequality of gender in a patriarchy society (Tisdell, 1998). The result was derived from a sample comprised participants mainly from Taiwan. From the view of diversity, the result may provide a start for the future studies applying in different culture and ethnic groups. The generalization of this research result, hence, needs validation by future studies. Further model invariance analysis could also be done to see how gender differs in personal epistemology development process.
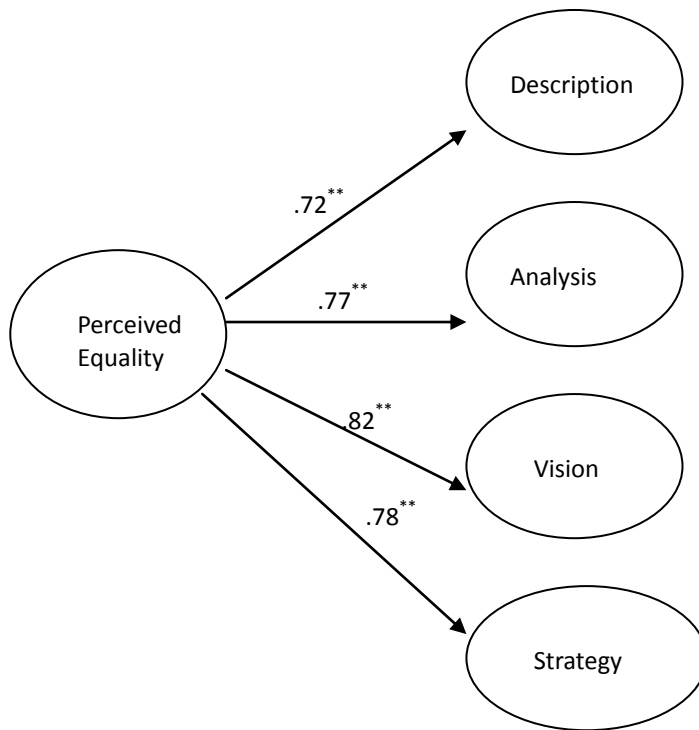
Figure 1 Structure model and the estimate coefficients

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# 行政院國家科學委員會補助國內專家學者出席國際學術會議報告

2013 年 6 月 17 日

| 報告人姓名 | 朱子君 | 服務機構及職稱 | 國立台北教育大學副教授 |
|---|---|---|---|
| 時間 | 102 年 6 月 17 日至 102 年 6 月 21 日止 | 本會核定補助文號 | NSC 101-2511-S-007-003-MY2 |
| 會議地點 | 奧地利 Bad Hofgastien | | |
| 會議名稱 | International Journal of Arts & Sciences (IJAS) conference for academic disciplines | | |
| 發表 | Chu, Regina Juchun; Chu, Anita Zichun, Tu, Yu-Ling, & Chiang, Chih-Ting | | |
| 論文題目 | Competences for engineers | | |

We presented our primitive research results in the conference regarding competences for engineers especially for App developers. During the conference event, we also attended in other presentations including posters. Because IJAS conference encourages young scholars and students study abroad, we met several international students and young scholars in the meeting from various research fields, not exclusive in education or vocational education. Less than perfection was that we bump into the flood in mid Europe, compared to other IJAS conference we attended before, participants were significantly reduced.

In addition to formal presentations, posters are the most popular form and easy to reach in the conference. Participants were from U.S., Thailand, Canada, Taiwan, British English etc., research fields also cover engineering, science, social science, economy and education. We learned a lot from interdisciplinary discussions and met new friends. We also got the chance to be published in IJAS after advanced review process if we want.

Abstract:

With the development of internet and smartphone, application stores, such as App Store、Google play, are fast-growing. Consequently, mobile software industry develops rapidly that makes the shortage of human resources of the industry. Many mobile software development companies have to face the shortage of high-quality of human resources. While recruiting, the employers cannot foresee the performance of the potential employees based on his/her knowledge of

specialty. Therefore, this research tries to study the ability scale of the smartphone software engineers based on the study of Ibarra (2010) and others whose competency framework for smartphone software engineers are divided into three dimensions, including skills, social, and personal.

This study applies the Analytic Hierarchy Process (AHP) in the expert decision analysis. Participants of the survey are key experts in the related files, such as project managers and programmers. Most experts believe that the most important ability in the mobile phone software development process is "social" that means the importance of relationship in the organization. The most five important indicators of abilities among all forty-four evaluation indicators are *leadership*, *ambition*, *to understand and follow the discussion*, *analysis*, *judgment and an extension of the pragmatic solution*. Project managers and programmers have different viewpoint on capacity indicators. The former think the actual ability to execute tasks is the most important one. The latter, however, more emphasize on the potential of the individual.

The purpose of this study would like to develop the competency framework for smartphone software engineers as the evaluation criteria for recruitment. The result of the survey could be applied as the reference for college plan of the teaching objectives in the related departments.

**Key words:** Competency, Analytic Hierarchy Process (AHP)



We brought back CD containing paper abstracts, Participation certificates.

# 科技部補助計畫衍生研發成果推廣資料表

| 科技部補助計畫 | 計畫名稱: 中高齡女性成人網路學習互動歷程：平等覺受與知識建構 |
| --- | --- |
| | 計畫主持人: 朱如君 |
| | 計畫編號: 101-2511-S-007-003-MY2　　　學門領域: 性別與科技研究 |

無研發成果推廣資料

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| 科技部補助計畫 | |
| --- | --- |
| | 計畫名稱: 中高齡女性成人網路學習互動歷程：平等覺受與知識建構 |
| | 計畫主持人: 朱如君 |
| | 計畫編號: 101-2511-S-007-003-MY2 |

# 101 年度專題研究計畫研究成果彙整表

| 計畫主持人：朱如君 | | 計畫編號：101-2511-S-007-003-MY2 |
|---|---|---|

計畫名稱：中高齡女性成人網路學習互動歷程：平等覺受與知識建構

| 成果項目 | | | 量化 | | | 單位 | 備註（質化說明：如數個計畫共同成果、成果列為該期刊之封面故事...等） |
|---|---|---|---|---|---|---|---|
| | | | 實際已達成數（被接受或已發表） | 預期總達成數(含實際已達成數) | 本計畫實際貢獻百分比 | | |
| 國內 | 論文著作 | 期刊論文 | 0 | 0 | 100% | 篇 | |
| | | 研究報告/技術報告 | 0 | 0 | 100% | | |
| | | 研討會論文 | 1 | 1 | 100% | | |
| | | 專書 | 0 | 0 | 100% | | |
| | 專利 | 申請中件數 | 0 | 0 | 100% | 件 | |
| | | 已獲得件數 | 0 | 0 | 100% | | |
| | 技術移轉 | 件數 | 0 | 0 | 100% | 件 | |
| | | 權利金 | 0 | 0 | 100% | 千元 | |
| | 參與計畫人力（本國籍） | 碩士生 | 4 | 4 | 100% | 人次 | |
| | | 博士生 | 0 | 0 | 100% | | |
| | | 博士後研究員 | 0 | 0 | 100% | | |
| | | 專任助理 | 0 | 0 | 100% | | |
| 國外 | 論文著作 | 期刊論文 | 1 | 1 | 100% | 篇 | |
| | | 研究報告/技術報告 | 0 | 0 | 100% | | |
| | | 研討會論文 | 0 | 0 | 100% | | |
| | | 專書 | 0 | 0 | 100% | 章/本 | |
| | 專利 | 申請中件數 | 0 | 0 | 100% | 件 | |
| | | 已獲得件數 | 0 | 0 | 100% | | |
| | 技術移轉 | 件數 | 0 | 0 | 100% | 件 | |
| | | 權利金 | 0 | 0 | 100% | 千元 | |
| | 參與計畫人力（外國籍） | 碩士生 | 1 | 1 | 100% | 人次 | |
| | | 博士生 | 0 | 0 | 100% | | |
| | | 博士後研究員 | 0 | 0 | 100% | | |
| | | 專任助理 | 0 | 0 | 100% | | |

| 計畫主持人：朱如君 | | 計畫編號：101-2511-S-007-003-MY2 |
|---|---|---|

計畫名稱：中高齡女性成人網路學習互動歷程：平等覺受與知識建構

| 其他成果<br>(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。) | 無 | | |
|---|---|---|---|

| | 成果項目 | 量化 | 名稱或內容性質簡述 |
|---|---|---|---|
| 科教處計畫加填項目 | 測驗工具(含質性與量性) | 2 | 發展兩個量表,一為平等覺受量表以及網路知識建構量表 |
| | 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 | |
| | 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報告自評表

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
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2. 研究成果在學術期刊發表或申請專利等情形：
   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 100 字為限）
   本計劃內容相關之中高齡成人網路學習相關論文，已有一篇獲刊登於國際期刊，兩篇準備中，因字數限制，請見成果報告。

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）
   學者可利用此研究結果進行更進一步對於中高齡婦女網路學習的研究，並在執行中對於中高齡女性學習者增能。