RESEARCH ON THE INFLUENCE OF SOCIAL MEDIA ON THE LEARNING OUTCOMES OF THE ELDERLY: AN OBSERVATION IN TAIWAN AREA

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Abstract

The main purpose of this study is to explore the impact of the use of social media in the curriculum on learning outcomes, studying the use of social media and learning ability as interference variables, and exploring the impact of curriculum identity and learning outcomes on the learning of the elderly. This study is based on the “Line” group as medium and is associated with the senior class students of the Open University of Kaohsiung, who act as a research target. The study found that learning motivation, identity and learning effectiveness are significantly and positively correlated. The use of social media can interfere with the relation between learning motivation, identity and learning outcomes, and learners who are willing to make use of social media interaction have a higher sense of identity in learning motivation, which is significantly and positively correlated with the learning outcomes.

Keywords: Line, social media, the elderly, senior citizens learning camp

A. Introduction

In normal social cognition, the use of social media and digital media is not associated with the elderly, since most of the elderly are incapable of using new media. They are "outsiders" who cannot participate in the society of digitalization. (Xu Chauxun, 2018/07/25) However, after the emergence of smart phones, some relevant statistics appeared. The Institute of Innovation Application Services announced the survey about "senior citizens " and found that among them the penetration rate of communication software LINE is extremely high. There are 3.18 million elders over the age of 65 in Taiwan, and 48.2% have smart phones, 90% of them use LINE, and nearly 60% of those aged 55 to 64 use Facebook with their smart phones. (Yan Liqian, 2015/01/13). It is obvious that the stereotype about the elderly who used not to have the opportunity to use digital devices like computers and mobile phones has been overturned.

"Identity" is a highly valued subject in psychology. From personal identification to social identity, it is the beginning of the psychological adjustment and the motivation of learning shared by everyone with social connection. Identity and the learning of the elderly are closely related, because adults will seek a clear set of self-definition and definite goals, values, beliefs. These commitments will be gradually evolved and selected in a developmental trend, then making individuals embrace their own life orientations, goals and meanings. (Waterman, 1984)

Identity and adult learning is closely related. Without identity, there will be no direction, and without direction, there will be no meaning of learning, and no motivation for learning. "Identity of certainty" refers to the individual's clear awareness of the goals, values, beliefs, and abilities that they adhere to, and to the experience of the social requirements of daily life with persistence even when time and space change. To those senior learners, the most critical point is their attitude and cognition of learning motivation for their re-entry into the campus. (Chen Kunhu, Lei Gengling, Wu Yingwei, 2005).

But how can we know the identity and motivation of senior students? How can we get a better understanding of the hidden feelings that we cannot see through? In addition, social media is operated...
through the Internet, so people can break through time and space restrictions, conducting ubiquitous learning by it. There seem to be certain difficulties in knowing the identity of senior learners.

Therefore, this study hopes to explore the recognition and motivation of senior learners to re-enter the campus, and to find a set of methods that can be objectively evaluated as a tool to measure learners’ identification and motivation, and further explore its impact to effectiveness in learning. In addition, we try to find out whether social media will influence the relationship between learners' learning motivation and learning outcomes, and how learners' learning ability affects the relationship between identity and learning outcomes. These problems have not been specifically answered in past studies. Therefore, this study intends to use the experimental design method to design the group of the social media “Line” for the elderly, and use it as a sample to conduct quantitative research on the aforementioned problems.

B. Literature review

1. The impact of social media and "Line" on senior learning

"Social media" refers to the mode of communication through virtual networks based on the development of the Internet. Social media refers to the use of the Internet to provide users with the ability to create, share, exchange information and ideas, and provide users with virtual rather than physical interaction. (Kaplan & Haenlein, 2010; Mangold & Faulds, 2009).

Currently, the world's mainstream social platforms are Facebook, YouTube, Twitter, LINE, Instagram and WeChat, etc., especially Facebook is the platform used by the most people in the world. In 2017, there are more than 2 billion users, and its subordinate platforms WhatsApp, Facebook Messenger, Instagram have a total of more than 4.37 billion users. (Zhan Yidong, Zhang Jiaming, Chen Wenzhao, Huang Ruirong, 2015)

With the operation different from the past mass media, the social media turned the "top-down" one-way message transmission process into a "two-way or multi-directional" communication mode. That is, in the past you can only be a passive audience, but now you can be a meaning creator of social media. (Shi Bojun, 2014)

LINE (Korean: 라인; Chinese: connect me, connect and plus, connect) originated on March 11, 2011, when a strong earthquake stroke Japan and caused a tsunami. At that time, traffic was chaotic, and mobile phone signals were completely lost. People could not contact each other and telecommunications equipment was completely useless. In order to allow everyone to break through the isolation of space and time, NHN Korea developed the software “LINE”, hoping that it could reunite people like a line. Users can transfer multimedia messages and calls such as text, pictures, animations, voices, and videos to other users via the Internet without additional charges. (Chen Guanrong, 2016/3/24)

Although the initial development of Facebook and LINE started from the community side and the communication side, Facebook also developed an instant message transmission function of "Messenger", and LINE also established "Create Group" and "Official Account" to link the group and achieve a “herding” effect of social media. Then they formally expanded from instant messaging to "social media."

According to a survey report from the Institute of Innovation Application Services, it was noted that half of the people, aged 65 and older, in Taiwan have smart phones, and they also love community websites. More than 90 percent of them are LINE users, and nearly 60 percent also use Facebook. (Liu Jiqing, 2017/8/16)

From data mentioned above, the elderly in Taiwan are the dedicated users of LINE. This kind of software not only has the function of instant messaging, but also plays the community function of
setting up a community and linking up a “small circle” of good friends.

2. The Stereotype of the Learning Ability of the Elderly in Media Communication

Stereotype is also called "immobilization effect." The original meaning is the concept, viewpoint, belief of "traditional, formulaic, excessively simplistic", or thinking some events, individuals, and groups as unchanging patterns, then forming a generalized and fixed view. (Liu Xiaohong, Bu Wei, 2001). Once a stereotype is formed, it is difficult to be changed; and it is very likely to cause trouble to the same type of people and things. Such effects are commonly seen in issues such as gender, religion, race, appearance, preferences, politics, age, identity, or social status.

Stereotypes are naturally formed in life. The public will automatically classify everything through self-experience. So stereotypes are formed from cobbled together messages from different sources; then forming impressions; and finally changing, and taking shape, ideas for things. (Bloom, 2014).

Stereotypes have three basic concepts: the interpretation of things by a person or group; it can reduce the complexity of thinking about new things; and it is also a demonstration of group-thinking. (McGarty, Yzerbyt & Spears, 2002) Sherman, Bessenoff & Frost (1998) thought that people also needed stereotypes to some extent because they can form a framework to cut back the time and resources of cognition, so they can turn their attention to dealing with unprocessed events. This shows that people need stereotypes and do not reject the reason of this concept journey.

In a news report, the media has accumulated a certain concept of information to a certain group for a long time so that the public will be influenced to have some specific perception to a certain group or thing; then a stereotype will be formed. (Xu Lizhi, 2016/8/8) It can be seen that the media is an important channel for the public to form stereotypes.

It’s often seen in the media that the elderly are linked to the expressions “cannot operate smart phones, cannot understand the Internet”, even in the telecommunications company's teaching plan, which is locked in the "silver hair" mobile phone teaching. They make a clear distinction that it is the “young people” not “older people” who use smart phones and the Internet. In their advertising language, "the young people are accustomed to using smart phones to communicate and share their lives"; and they collectively call senior citizens “old people” who "worry about not keeping up with the times" and "worry about the generation gap getting deeper and deeper", and even have "information anxiety", and so on. It highlights the contrast between "young people can" and “the elderly cannot.” So learning the LINE program and taking a selfie, makes "silver elders" into "web beauties." (Xu Yuxun, 2018/7/25)

From the above-mentioned terms that often appear in the media, it can be known that the elderly are often labelled by the media as unable to handle digital transactions. To simplify the interpretation of the elderly population, and to reduce the complexity of thinking about new things, the media classifies senior citizens as "silver hair"; and the elderly are often associated with "digital, network disability"; and the media creates a stereotype and makes it a more understandable general interpretation to the public.

3. The Sense of Identity and the Learning Motivation of the Elderly

Erikson, a professor of psychology at Harvard University in the United States, put forward the concept of "psychosocial stages", which divides life into eight periods, referred to as "eight segments of life."
He believed that physical and mental development in any period of life is smooth or is not related to the development of its previous period; in other words, as long as you manage your life well in each period, there will be a good influence on the future, which will be helpful in the later developments.

In addition, every period of life could be the key to "crisis and turnaround", each with its specific problems and difficulties. Before the difficulties are resolved, the psychological crisis will persist; when the difficulties are solved, the crisis will be resolved. Only when we turn the crisis around can our life be developed smoothly. (Zhang Chunxing, 1991)

Table 2: 1 Erikson psycho-social period

<table>
<thead>
<tr>
<th>period</th>
<th>age</th>
<th>Psychological crisis (turning point)</th>
<th>develop smoothly</th>
<th>develop with difficulties</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1</td>
<td>(trust VS.mistrust)</td>
<td>Trusting people with sense of security</td>
<td>feeling anxiety while dealing with other people</td>
</tr>
<tr>
<td>2</td>
<td>2-3</td>
<td>Lively, active VS shameful, doubtful</td>
<td>self-control, acting with confidence</td>
<td>self-doubting, being overcautious in action</td>
</tr>
<tr>
<td>3</td>
<td>3-6</td>
<td>automatic VS holding back, feeling guilty</td>
<td>having goals and directions</td>
<td>fear and flinch, lacking self confidence</td>
</tr>
<tr>
<td>4</td>
<td>6-adolescence</td>
<td>(industry VS.inferiority)</td>
<td>With basic abilities of studying, working, and dealing with people</td>
<td>lacking basic abilities for living, being full of frustration</td>
</tr>
<tr>
<td>5</td>
<td>adolescence</td>
<td>(identity VS.confusion)</td>
<td>Clear self-image, clear goals</td>
<td>lacking life goals, being lost</td>
</tr>
<tr>
<td>6</td>
<td>adult</td>
<td>(intimacy VS.isolation)</td>
<td>Successful social connections, setting up the foundation of a successful career</td>
<td>lonely, being not able to keep an intimate relationship with other people</td>
</tr>
<tr>
<td>7</td>
<td>middle-age</td>
<td>(generativity VS.stagnation)</td>
<td>Loving family, cultivating the younger generation</td>
<td>self-indulgence, neglecting the future</td>
</tr>
<tr>
<td>8</td>
<td>Old age</td>
<td>(integrity VS.despair)</td>
<td>Doing whatever they want, living a happy life</td>
<td>remorse for the past, always regret</td>
</tr>
</tbody>
</table>

Source: Modern Psychology Zhang Chunxing, 1991

Marcia, another scholar, offered a viewpoint of "identity status." From the four directions of career choice, religious beliefs, political ideas, and gender role, we can understand the self-identity and identity crisis in adolescence; and define four identity states: (1) identity by diffusion; (2) identity moratorium; (3) identity achievement; and (4) identity foreclosure.)
In the “identity status” view, the identity achievement has characteristics of deep understanding of self, internal power stability, higher self-control, and self-esteem. Life can be developed smoothly in the future. On the contrary, if one fails in self-identification, they will lack characteristics of having a predetermined goal in action and lack of ideal of life; that is, with the difficulties in self-identification leading to self-lost. (Marcia, 1966)

From the dissertations of two scholars, it can be known that elderly people will get into the self-evaluation between "perfect and remorseful life" in old age. Those who have learning motivation and are willing to go into the campus again, mostly have a better value in life and identity. Therefore, it can be said that there is a close and inseparable relationship between identity and learning motivation of the elderly. (Chen Xinxin, 2019)

Biscoe and Stone (1980) believed that learning behavior cannot happen unless the individual is aware of, and agrees to the need for learning, and generates motivation for learning. Therefore, the motivation of learning with a sense of identity is the foundation of learning behavior. Once the motivation for learning is lost, even if there is a good course content, it is difficult to attract adult participation or the continuation of learning.

4. The Social Media Interaction and Learning Ability Concept

"Interaction" is the exchange of information, reaction, and feedback between people and machines. By interacting with learners and social media to achieve individualization and adaptation, social media is a "problem-response reward" operation interface. The operation interface can deepen the learner's understanding. Through feedback, learners can understand their actual learning outcomes and understand the gap with expected results. (Gao Qizhou et al., 2005). Interactivity is an important element in the use of social media in learning. This study expects to understand the influence of the interaction of the digital teaching materials on the response time of the learners, the influence of the interactive materials on their learning outcomes, this kind of learning is also the most concerned mobile learning (M-Learning). (Jiang Yixin, 2016)

Zheng Jingyu (2002) believed that for students, there are existing differences in learning ability; and it will be expressed in learning attitudes, knowledge, learning speed, adaptability, concentration, and academic achievement. However, the concept of social media used in learning is a learner-centered, individualized learning environment, and self-directed learning style. (Chen Nianxing, Yang Jintan, 2006) At the same time, the digital learning environment is also prone to "missing directions" or "wrong learning methods" due to "hyperlinks." (Wang Hua, Yang Kai, 2015) Therefore, this study hopes to explore whether the difference of ability in senior citizens will affect the relationship between learner response time and learning outcomes.

C. Research Methods and Design

1. Research Hypothesis

In this study, the LINE group message was used to collect the reaction time of the subjects, and through empirical data analysis to explore the correlation between the use of social media and the effectiveness of learning. The reaction time refers to the time required for the individual to perform the psychological processing of the message processing and actions controlling between the stimulus input and the response output. It also can be said for the time spent on performing stimulus confirmation and response selection. (Guan Haisheng, Lin Yaofeng, 2011) There are three forms of reaction time: (1) Simple reaction time (SRT) (i.e. give the experiment subject a single m and only require a single reaction); (2) Choice reaction time (CRT) (i.e. give the experiment subject different stimulus, and require the corresponding reactions); (3) Distinguish reaction time (DRT) (give the experiment subject different stimulus and require only one respond to the specific stimuli). (Magill, 1989)

In psychology, there is a "message processing learning theory" to explain how people in the environment absorb and use the knowledge through
the sensory awareness, attention, identification, memory, and other psychological activities, and choose which ones are to be paid attention to and which are to be forgotten. Stimuli that are sensed and paid attention to will enter short-term memory and respond appropriately. Both the response time and the attention required for message processing must be constructed under the cognitive motivation of identification. Without approval, no attention is paid and there is no reaction nor memory. It can be said that identity is the most basic element leading to learning outcomes. (Zhang Jiafang, Lin Yaofeng, 2009)

Therefore, this study proposes the following assumptions:

Hypothesis 1: Social media has a positive impact on learning motivation, identity, and learning outcomes.

Social media interaction deepens the mutual understanding of learners. Through feedback, learners understand the gap between self-learning outcomes and expected outcomes. (Gao Qizhou et al., 2005) Ha & James (1998) believed that users and related personnel transmitting information and interacting through the website form interpersonal communication. In the virtual world of the Internet, the interactive function of the website with customers affects customer loyalty and identity (Deighton, 1996). Therefore, interactivity is an important success factor for digital learning. Therefore, interactivity should affect the learner's sense of identity. That is to say, the higher the interaction between the participating learners, the greater the influence on the learners' motivation, identity, and learning effectiveness. On the contrary, the lower the interaction of the participating learners, the lower the impact on the learners' motivation, identity, and learning outcomes.

Hypothesis 2: The interactivity of social media will influence the relationship between learning motivation, identity, and learning effectiveness.

From the "Hypothesis 1" deduction, the higher the interaction of social media, the greater the impact on the relationship between learner identification and learning effectiveness. The lower interaction of social media users, the lower the impact on the learners' motivation, identity, and learning outcomes.

O'Dowd (2005) In the senior age, there is more concern for personal and pleasure-driven learning. It no longer regards learning as an obligation; it is self-directed learning. It is a learning process which includes initiating individuals' motivation of learning, formulating learning objectives and plans, seeking learning resources and assistance, executing learning plans, and evaluating learning outcomes. (Huang Fushun, 2004; Li Yahui, Ye Junting, 2014). Some scholars believe that elderly learners engage in learning activities as a way of social participation in order to avoid loneliness and a boring life (Kim & Merriam, 2004). This shows that elderly learners have entered the realm of pursuing self-identity and have triggered the learning motivation.

Hypothesis 3: Learning motivation influences the relationship between learner identity and learning outcomes.

The higher the motivation for learning, the greater the impact on the relationship between learner identity and learning outcomes. The lower the motivation for learning, the smaller the impact on learner identity and learning outcomes. Based on the above research hypothesis, the hypothetical architecture diagram of this study is shown in Figure 3.1.

![Figure 3.1 Hypothetical architecture diagram of this study](image-url)
2. Research Design

a. Study the Operational Definition of a Variable

1. Identity: This study explores the response time and recognition of senior citizens to LINE; integrates the curriculum and students into social media teaching; and through observing the system, gets the reaction time and response data of the “read” information for testing the response time of subjects to the reporter’s message. The system design is a measurement interval for each class. When the semester begins in “Senior University”, subjects get the detection information randomly from time to time to measure the response time and the degree of concern of the students. During the experiment process, the experimental sample presents that the shorter the response time, the more he/she cares about the message in the social media community; the longer the response time, the less he/she cares about the curriculum in the community. Therefore, the way to calculate the identity of the curriculum through social media is: personal identity = total response time maximum - personal response time.

Figure 3.2 Experiment Test Pictures
2. Learning Effectiveness: Before and after the relevant courses of "Senior University", the experimental samples are oral tested.

3. The Interaction of Social Media: There are two evaluation levels: high and low. The high interactive learning feedback of this study focuses on the interaction between students and learning content. Through the Hyperlink with the Open University of Kaohsiung digital learning ILMS system interaction, students are required to fill in the curriculum-related questionnaires to express the response of classroom learning effectiveness and identity, as shown in Figure 3.3.

This hyperlink is a controllable interface that allows learners to answer the questions set by the school one-by-one through the smart phone screen control. Through the question options set by the Open University, there is what develops an immediate, selective, bidirectional, and personalized interaction requirements between the learner and the learning content.

There is also an after-school test that responds to the message, which can immediately give back and present the test scores to meet the feedback requirements of the interactive interface. But the other group of "low interaction in social media" in
the experiment does not provide these functions, and there are only text and pictures in the LINE group for learners to browse. The learner cannot control the hyperlink in the teaching content.

4. Student Ability: There are two evaluation levels: high and low. According to operating smartphones, Internet access abilities, and LINE group establishing and operating capabilities, subjects are grouped into high learning ability and low learning ability.

5. Control Variables: Includes the students who have attended the Senior University class and the time of the test (half an hour).

Figure 3.3 Open University of Kaohsiung City Digital Learning ILMS System

Open University of Kaohsiung

Questionnaire

3. The Research Object

This study used quasi-experimental design to study seniors who had attended a senior college in Kaohsiung. These students have had a basic study of computer and mobile phone courses. There is a mobile phone photography or online operation class for each course. So they can have basic information literacy and ability for operating smartphones. Randomly selected students of the class on that day are grouped into four experimental groups to receive four online learning lessons, each a half-hour, as shown in Table 3.1.

<table>
<thead>
<tr>
<th>study unit</th>
<th>Experimental group and numbers</th>
<th>total number</th>
</tr>
</thead>
<tbody>
<tr>
<td>social media courses, hyperlinks, online interactive materials and questions</td>
<td>highly interactive digital teaching materials</td>
<td>high ability group (29 persons) low ability group (29 persons)</td>
</tr>
<tr>
<td></td>
<td>lowly interactive digital teaching materials</td>
<td>high ability group (33 persons)</td>
</tr>
</tbody>
</table>
D. Empirical Analysis

This study is based on the method of surveying the response time of social media users to measure learner identification, learning motivation, and collect empirical data. The purpose is to explore the relevance between interaction of social media and senior learners’ reaction time and the effectiveness of learning.

This chapter will analyze _______ based on empirical data, verify the relationship between the main effect related analysis of social media users’ reaction time and the learning outcomes of the research, and further analyze and do related verification on the media messages response time of senior social media users and their learning achievements. The chapter will also make related analysis on the social media interactions and the signal detecting reaction time of the elderly learners.

Finally, put the following into the interference variables: interaction of teaching materials, students’ social media operating abilities; in order to understand the impact about the interference variables to the learning motivation and learning outcomes of elderly learners.

1. Verification of Social Media Function to the Senior Learners’ Identity and Learning Effectiveness

In verifying the relationship between the identity and learning outcomes of senior social media users, this study assumes that while not under the influence of other factors, we take the identity of senior social media users as self-varient, and the learning outcome as dependent variable to perform a linear regression analysis. Its regression model is shown in equation (1).

\[ Y = \beta_0 + \beta_1X + \varepsilon \]  

\( Y \) = Learning effectiveness  
\( X \) = The identity of senior social media users  
\( \varepsilon \) = Errors

From the results of F verification, we know that the regression equation is provided with significance (\( \beta \) value = 0.497, \( p \) value = 0.000), after adjustment, \( R^2 \) is 0.239, as shown in Table 4.1. That is to say, the higher the identity of senior learners, the higher the learning outcome will be. Therefore, the hypothesis is supported. This discovery has the same effect as the traditional way of learning.

Therefore, it is helpful for teachers of senior learners to put management of social media into the course to enhance teaching connotation and student identification.

<table>
<thead>
<tr>
<th>β value</th>
<th>t value</th>
<th>p value</th>
</tr>
</thead>
<tbody>
<tr>
<td>constant</td>
<td>11.408</td>
<td>0.000</td>
</tr>
<tr>
<td>6.213</td>
<td>0.000</td>
<td></td>
</tr>
<tr>
<td>( R^2 )</td>
<td>0.248</td>
<td></td>
</tr>
<tr>
<td>adjusted ( R^2 )</td>
<td>0.239</td>
<td></td>
</tr>
<tr>
<td>( F )</td>
<td>38.745</td>
<td></td>
</tr>
<tr>
<td>( p=0.000 )</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

note : * \( p<0.05 \)
2. The Interference Effect of Social Media Interaction

We examine the relationship between social media interaction and senior learners’ response time and learning effectiveness through "multiple regression analysis" in this section. Then we shall take the three variables of identity, interaction, and interaction effect to identity and interaction as self-variants and perform multiple regression analysis with the learning outcomes as dependent variable. Social media interactions are handled in the way of virtual variable. Its multiple regression model is shown in equation (2).

\[ Y = \alpha + \beta_1 X + \beta_2 D + \beta_3 X * D + \varepsilon \quad (2) \]

\( Y \) = Learning effectiveness

\( X \) = Identity

\( D \) = Social media interaction (1 = high-interaction teaching material and 0 = low-interaction teaching material)

\( \varepsilon \) = Errors

It can be seen from Table 4.2, the interaction between identity and interaction is significant (\( \beta \) value = 0.470, \( p \) value = 0.018), after adjustment, \( R^2 \) is 0.292. It represents the relationship between the attention of learners and the learning Effectiveness, which will be affected by media interactivity. That is, high-interaction social media design (Design 1) will have a greater impact on the learning outcomes of the senior learner than low-interaction social media design (Design 0).

Table 4.2 Impact of Social Media interaction on the senior learners’ learning outcome

<table>
<thead>
<tr>
<th></th>
<th>( \beta ) value</th>
<th>( t ) value</th>
<th>( p ) value</th>
</tr>
</thead>
<tbody>
<tr>
<td>constant</td>
<td>7.302</td>
<td>0.000</td>
<td></td>
</tr>
<tr>
<td>senior learners’ identity interaction</td>
<td>0.573*</td>
<td>5.326</td>
<td>0.000</td>
</tr>
<tr>
<td>Identity × Interaction</td>
<td>0.309</td>
<td>1.376</td>
<td>0.161</td>
</tr>
<tr>
<td></td>
<td>0.470*</td>
<td>2.274</td>
<td>0.018</td>
</tr>
<tr>
<td>( R^2 )</td>
<td>0.312</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Adjusted ( R^2 )</td>
<td>0.292</td>
<td></td>
<td></td>
</tr>
<tr>
<td>( F )</td>
<td>17.213</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(p=0.000)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>note : * ( p &lt; 0.05 )</td>
<td></td>
<td></td>
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</tbody>
</table>

3. Interference Effects to Students’ Social Media Operating bility

This study examines the interference effect of students’ social media operating abilities to the relationship between the learner’s identity and learning outcomes. As the equation \( Y = \alpha + \beta_1 X + \beta_2 D + \beta_3 X * D + \varepsilon \), it takes three variables of identity, social media operating ability, interaction effect of identity, and social media operating ability as self-variants; and it performs multiple regression analysis with the learning outcomes as dependent variable. Social media operating abilities are handled in the way of virtual variables. (1 for high, 0 for low)

From Table 4.3, it can be found that the relationship between student identification and learning effectiveness is not interfered by the students’ social media operating abilities (\( \beta = 0.051, \ p = 0.086 \)), which means "the relationship between identity and learning effectiveness of the elderly" won't be different because of the difference of the students’ social media operating abilities.

Table 4.3 Interference effects to Students’ social media operation abilities

<table>
<thead>
<tr>
<th></th>
<th>( \beta ) value</th>
<th>( t ) value</th>
<th>( p ) value</th>
</tr>
</thead>
<tbody>
<tr>
<td>constant</td>
<td>7.740</td>
<td>0.000</td>
<td></td>
</tr>
<tr>
<td>senior learners’ identity</td>
<td>0.462*</td>
<td>4.348</td>
<td>0.000</td>
</tr>
<tr>
<td></td>
<td>senior learners’ learning motivation</td>
<td>identity</td>
<td>identity × operating ability</td>
</tr>
<tr>
<td>--------------------------</td>
<td>--------------------------------------</td>
<td>----------</td>
<td>------------------------------</td>
</tr>
<tr>
<td>social media operating ability</td>
<td>0.104</td>
<td>0.601</td>
<td>0.677</td>
</tr>
<tr>
<td>Identity × operating ability</td>
<td>0.051*</td>
<td>0.202</td>
<td>0.806</td>
</tr>
<tr>
<td>$R^2$</td>
<td>0.285</td>
<td></td>
<td></td>
</tr>
<tr>
<td>adjusted $R^2$</td>
<td>0.232</td>
<td></td>
<td></td>
</tr>
<tr>
<td>$F$</td>
<td>15.427</td>
<td></td>
<td></td>
</tr>
<tr>
<td>$(p=0.000)$</td>
<td></td>
<td></td>
<td></td>
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</tbody>
</table>

note : * $p<0.05$

### Conclusion and Suggestion

After the quantitative discussion of this study, the following conclusions were drawn. Social media and smart phones are in power right now, and we believe this research will have certain help and reference values to those teachers who are engaged in senior education.

1. Conclusion

After quantitative evidence of this study, three conclusions were obtained:

a. There is a significant positive correlation between senior learners’ learning motivation, identity, and learning outcomes.

The stronger the identity of the elderly, the higher the motivation for learning, and the higher the relative learning outcome. This point of view is the same with traditional learning. Elderly learners using social media will promote a higher sense of identity than to have higher learning outcomes. Therefore, using social media in senior teachings is a feasible and necessary action to enhance the sense of identity and learning motivation. Teachers work hard to manage this interactive online bridge, which will enhance students’ learning outcomes.

b. Social media interaction will affect the relationship between seniors’ sense of identity and learning outcomes.

The study found that the relationship between social media and learning outcomes will be affected in differing degrees because of the differences in the use of interactions (hyperlinks).

The "High-interaction Social Media course" will have a greater impact on the learning outcomes of the elderly than the "Low-interaction Social Media course." Obviously, the hyperlinked teaching materials can provide more multi-learning opportunities for the elderly. Therefore, for Senior University or teachers engaged in elderly teaching, it is necessary to create high-interaction links to social media to promote the student usage and to enhance identity and learning outcomes.

c. The social media operating ability does not affect the seniors’ learning motivation and identity.

Elderly people go back to school resuming their study, which is not affected by their unfamiliarity to the social media operating ability. Therefore, there is no significant relation between their smart phone and social media operating proficiency and the learning identity and motivation. It means that the social media operating ability does not affect the seniors’ learning motivation and identity.

2. Research Limitations and Future Research Suggestions

Based on the conclusions of this study, we put forward the discussions of research limitations and suggestions for future research as follows:

a. The elderly range is too large; the samples are too limited. So it is difficult to define:
Limited by the scale, the small-scale random sampling is used for an experimental design method. We selected samples in the Senior Universities where the researchers work, so most of the students were limited to several blocks in Kaohsiung because of the geographical limitation. Whether the results can represent the majority of Kaohsiung or even the whole Taiwanese or not will need to be supported by subsequent research.

In addition, the definition of "elderly" is too vague. It seems that the age of 55 for senior university standard is too far-fetched. And it also should be considered the time to market and application status of smart phones, then we can define the level of user’s ability more clearly. That will make the research provided with more rigorous academic reference value.

b. The elements of the audio-visual generation should be added:

In order to get the results of the experiment in a short time, the process of this study is relatively monotonous. Using text and hyperlinks as content is not an easy way to read and operate for the elderly. Subsequent researchers can consider adding more popular audio or video material. Caring for the elderly’s predicament and making it easier for them to learn and make friends from social media, we can help them get higher learning motivation and identity, and achieve better learning results.

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