

Influence of Computer Attitude on Critical Thinking Disposition

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Abstract

This study was conducted to investigate the effects of computer attitudes such as anxiety, confidence, preference, usefulness, and computer literacy on their critical thinking ability, targeting college students at unspecified university universities. The period of data collection was from January 10, 2020 to January 17, 2020. A total of 213 people participated in the study. For data analysis, SPSS 18.0 was used for frequency analysis, Pearson correlation, χ^2 square, and simple regression analysis. As a result of the analysis, the difference of interests under the statistical significance level among general characteristics was Gender ($\chi^2=55.7^{***}$, $p<0.001$), Age ($\chi^2=407.5^{***}$, $p<0.001$), Resident ($\chi^2=127.5^{***}$, $p<0.001$) Family ($\chi^2=289.4^{***}$, $p<0.001$). In the simple regression analysis, computer liking ($t=2.102$, $p<0.05$) and computer use ability affected Truth seeking ($t=-6.319$, $p<0.01$), computer use ability was affecting analyticity ($t=-5.630$, $p<0.01$), computer use ability was affecting systematicity ($t=-2.545$, $p<0.05$), computer use ability was affecting maturity under statistical significance ($t=-2.583$, $p<0.05$). In conclusion, this study suggests that computer liking and computer use ability affect the sub-factor components of critical thinking disposition, truth seeking, analyticity, systematicity, and maturity, therefore the emphasis of this study is to emphasize that it is desirable to use the computer as a medium of learning based on computer literacy rather than worrying about excessive computer use.

Keywords: Analyticity, Computer Attitude, Maturity, Systematicity, Truth Seeking,

1. Introduction

The modern society is bringing new changes in every place of life due to the rapid development of computer utilization, and this change is expected to accelerate further. Computers are actively being used as a educational tools, and educational effects on them are continuously being studied. According to a recent study, teenagers between the ages of 12 and 19 use 99.9% of the computer-enabled Internet, which is almost 100% [1], and according to the 2014 E-Learning Industry Survey [2], 57.6% of all people use e-learning. These statistical results show that computers and information devices are not only deep in our lives, but also important in education. However, the reality is that the attitude toward the computer plays a negative role in daily life. For

example, it is pointed out that the daily use of computer goes beyond convenience, causing problems such as Internet addiction and cybercrime, and extending to serious social problems [2]. In other words, adolescents and parents experience conflict with each other due to excessive use of computer [3]. Furthermore, adolescents who experience stigma from important others, such as parents, teachers, and friends, have weakened social ties [4], they have difficulty in school adaptation [5]. The stigma that adolescents experience with computer use should be treated as important because it can lead to future mal behavior. This is because social stigma perceived by adolescents causes them to perceive themselves negatively, which affects mal behavior [6]. In particular, adolescents who experience stigma from their parents may perceive themselves as problem children and this self-consciousness may lead to mal behavior [7]. This a concern has become a reality that cannot be overlooked.

On the other hand, a positive view of the use of computers reported that learners' computer literacy and access to computers had a significant effect on academic achievement [8-11]. Educators using computer media report that, if they make full use of the unique characteristics of advanced media such as computers, they can be an important learning tool for effective and efficient teaching and learning [12], if the computer is used for teaching or learning purposes, there is a high possibility that it is positively related to academic achievement [8]. Computer-based learning has been shown to have positive effects not only for normal developmental learners but also for students with developmental disabilities [13]. Thus, not only normal development learners but also students with developmental disabilities are effective, and computer literacy has a positive effect on academic achievement and satisfaction [14]. In addition, the correlation between computer-related attitudes and learning was high in almost all areas [15]. Nevertheless, the basic information through the survey is only presented about the current status of computer facilities and the satisfaction level of teachers and students in the education industry that is building computer facilities through educational information policy [16]. In other words, there is little research on the psychological perceptions of students in actual class situations. In order for the computer-based instruction, which is being attempted in the educational field, to proceed more effectively, students' perception of the current computer-based learning environment should be systematically investigated.

Therefore, this study integrates the attitudes toward the computer studied so far, and how the anxiety, confidence, preference, usefulness, and computer use of the computer are related to the students' critical thinking ability. The purpose of this study is to investigate the impact and to use the results of this study for further education. In other words, this study aimed to secure basic data on how to use the computer in the educational environment. The purpose of this study was as follows. First, the subjects' attitudes toward the computer were analyzed. Second, this study identified differences of interest according to the general characteristics of the subjects. Third, the effects of the attitudes toward the computer on critical thinking tendencies were analyzed.

2. Method

2.1 Research Design

This study was conducted to analyze the influence the influence of computer attitudes on critical thinking in college students as shown in Figure 1.

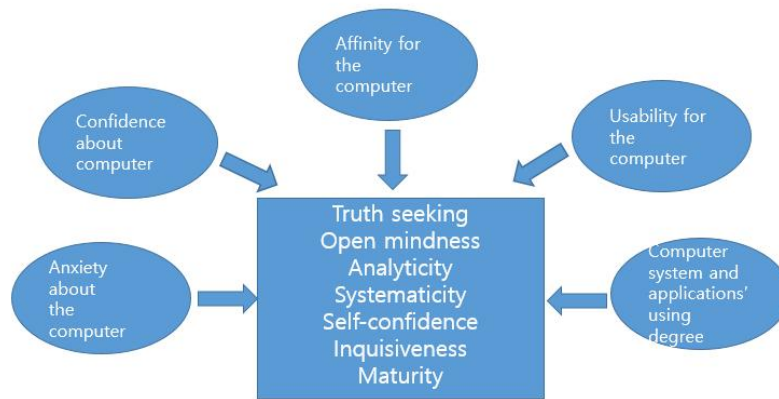


Figure 1. Research Design

2.2 Research tools

2.2.1 Attitude toward computer

As a tool for measuring attitudes toward computers, the computer attitude scale developed and modified by Loyd and Gressard [18] was used. Details of the tools are shown in Table 1. This tool consists of 40 questions that measure the four areas of computer anxiety, computer confidence, computer preference, and computer usefulness. This tool used 36 questions after verifying the validity of contents of one expert and one of nursing majors after deleting or modifying the contents that did not meet the purpose of the research or duplicated. This tool is a five-point scale, and a positive attitude toward a computer means that the score is higher. The combined score ranges from a minimum of 35 to a maximum of 180.

Table 1. Attitude toward computer

| Classification | Content | Question | |
|-------------------------------|--|---|--------------|
| Attitude towards the computer | Anxiety about the computer | The degree of fear of the computer and the anxiety of using it | 1-6 |
| | Confident about computer | Confidence in their ability to learn or use computers | 7-13 |
| | Affinity for the computer | Emotions that prefer a computer or enjoy using a computer | 14-22 |
| | Usability for the computer | The usefulness that computers can do for their work | 23-29 |
| Computer literacy | Computer systems and applications' using Degree | 30-36 | |

2.1.2 Critical Thinking disposition

The tool used to measure critical thinking tendencies was the critical thinking tendency developed by Facione in 1990. Critical thinking disposition requires not only cognitive abilities but also critical disposition to characterize behavior. Critical thinking disposition refers to the personal characteristics, habits, attitudes, and emotional dispositions necessary for critical thinking [19]. Facione et al. (1994) presented critical thinking

in seven areas [20]. The sub-factors of critical thinking disposition are Truth seeking, Open mindness, Analyticity, Systematicity, Self-confidence, Inquisitiveness, and Maturity as shown in Table 2.

Table 2. Critical Thinking Disposition

| Contents | Question | Cronbach alpha |
|-----------------|--------------------|----------------|
| Truth seeking | 1,2,3,4,5 | .938 |
| Open mindness | 6,7,8,9 | .717 |
| Analyticity | 10,11,12,13 | .640 |
| Systematicity | 14,15,16 | .847 |
| Self-confidence | 17,18,19,20 | .925 |
| Inquisitiveness | 21,22,23,24 | .880 |
| Maturity | 25,26,27 | .921 |

3. Result

3.1 General Characteristics

Frequency analysis was conducted to confirm the general characteristics of the participants as shown in Table 3. As a result, 69 men (32.4%) responded to the questionnaire and 144 women (67.6%). The ages were 57 (26.8%) for 19-20 years old, 69 (32.5) for 21-22 years old, 57 (26.8%) for 23-24 years old, and 30 (14.0%) for 25-28 years old. Religions consisted of 51 Protestants (23.9%), 9 Catholics (4.2%), 6 Buddhism (2.8%), 6 Others (2.8%) and None 141 (66.2%). The resident types were Dormitory 51 (23.9%), Live apart 69 (32.4%), Commuting 84 (39.4%), and Others 27 (12.7%). Currently, the number of families is 1 person 2.8%, 2 people 1.4%, 3 people 15.5%, 4 people 64.8%, 5 people 12.7%, 6 people 2.8%. Participants' hobbies were Reading book 2.8%, Exercise 16.9%, Music 12.8%, Tour 1.4%, Painting 1.4%, Game 4.2%, Nothing 22.5%, Computer, Eating, Shopping, Language, Beauty and cook were 1.4% each.

Table 3. General Characteristics

| Characteristics | N | % | Characteristics | N | % | | |
|-----------------|-------------------|-----|-----------------|-----------------|-------------------|------|------|
| Gender | Male | 69 | 32.4 | Resident | Dormitory | 33 | 15.5 |
| | Female | 144 | 67.6 | | Live Apart | 69 | 32.4 |
| Age | 19-20 | 57 | 26.8 | | Commuting | 84 | 39.4 |
| | 21-22 | 69 | 32.5 | | Others | 27 | 12.7 |
| | 23-24 | 57 | 26.8 | Hobby | Reading | 6 | 2.8 |
| | 25-28 | 30 | 14.0 | | Exercise | 36 | 16.9 |
| Family No | 1 | 6 | 2.8 | | Music | 27 | 12.8 |
| | 2 | 3 | 1.4 | | Tour | 3 | 1.4 |
| | 3 | 33 | 15.5 | | Movie | 63 | 29.6 |
| | 4 | 138 | 64.8 | | Painting | 3 | 1.4 |
| | 5 | 27 | 12.7 | Game | 9 | 4.2 | |
| | 6 | 6 | 2.8 | Nothing | 51 | 23.9 | |
| Religion | Protestant | 51 | 23.9 | Computer | 3 | 1.4 | |
| | Catholic | 9 | 4.2 | Eating | 3 | 1.4 | |
| | Buddhism | 6 | 2.8 | Shopping | 3 | 1.4 | |
| | Other | 6 | 2.8 | Language | 3 | 1.4 | |
| | None | 141 | 66.2 | Beauty | 3 | 1.4 | |
| | | | | Cook | 3 | 1.4 | |

| Family ($\chi^2=289.4^{***}$) | | | | | | | | | | | | | | |
|------------------------------------|-----|------|-----|-----|------|-----|-----|-----|-----|-----|-----|-----|------|---------------|
| 1 | 0 | 1.4 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1.4 | 6 (2.8) |
| 2 | 0 | 0 | 0 | 0 | 0 | 0 | 1.4 | 0 | 0 | 0 | 0 | 0 | 0 | 3 (1.4) |
| 3 | 1.4 | 0 | 2.8 | 1.4 | 2.8 | 0 | 0 | 0 | 1.4 | 0 | 0 | 0 | 5.6 | 33 (15.5) |
| 4 | 1.4 | 11.3 | 7.0 | 0 | 23.9 | 0 | 1.4 | 1.4 | 0 | 1.4 | 0 | 1.4 | 14.1 | 138 (64.8) |
| 5 | 0 | 2.8 | 2.8 | 0 | 1.4 | 0 | 1.4 | 0 | 0 | 0 | 1.4 | 0 | 2.8 | 27 (12.7) |
| 6 | 0 | 0 | 0 | 0 | 1.4 | 1.4 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 6 (2.8) |

3.1.3 Effect of Computer Attitude on Truth seeking

Simple regression analysis was conducted to analyze the effect of computer attitudes on Truth seeking (Table 5). The results showed that computer liking ($t=2.102$, $p<0.05$) and computer use ability ($t=-6.319$, $p<0.01$) affected Truth seeking under statistical significance.

Table 5. Effect of computer Attitude on Truth seeking

| Model | Non-stand. B | Factor SD | β | t | p | Statistics |
|----------------------|-----------------|--------------|---------|--------|--------|-------------------------------|
| (Constant) | 2.866 | .284 | | 10.105 | .000 | |
| Computer anxiety | .205 | .073 | .235 | 2.829 | .005 | R=.410, R ² =.168, |
| Computer confidence | -.009 | .096 | -.009 | -.096 | .924 | Modified R ² =.152 |
| Computer preference | .217 | .103 | .164 | 2.102 | .037* | F=10.514, P=.000 |
| Computer use ability | -.473 | .075 | -.489 | -6.319 | .000** | |

Dependent variable : Truth seeking, **, $p<0.01$, *, $p<0.05$

3.1.4 Effect of Computer Attitude on Analyticity

Simple regression analysis was conducted to determine the effect of computer attitudes on analyticity as shown in Table 6. The results showed that computer use ability was affecting analyticity under statistical significance ($t=-5.630$, $p<0.01$).

Table 6. Effect of computer Attitude on Analyticity

| Model | Non-stand. B | Factor SD | β | t | p | Statistics |
|----------------------|-----------------|--------------|---------|--------|--------|-------------------------------|
| (Constant) | 2.911 | .288 | | 10.124 | .000 | |
| Computer anxiety | .121 | .074 | .139 | 1.637 | .103 | R=.364, R ² =.133, |
| Computer confidence | .090 | .097 | .089 | .927 | .355 | Modified R ² =.116 |
| Computer preference | .146 | .105 | .111 | 1.388 | .167 | F=7.946, P=.000 |
| Computer use ability | -.428 | .076 | -.445 | -5.630 | .000** | |

Dependent variable : Analyticity, **, $p<0.01$, *, $p<0.05$

3.1.5 Effect of Computer Attitude on Systematicity

Simple regression analysis was conducted to determine the effect of computer attitudes on systematicity as shown in Table 7. The results showed that computer use ability was affecting systematicity under statistical

significance ($t=-2.545$, $p<0.05$).

Table 7. Effect of computer Attitude on Systematicity

| Model | Non-stand. Factor | | β | t | p | Statistics |
|----------------------|-------------------|------|---------|--------|-------|-------------------------------|
| | B | SD | | | | |
| (Constant) | 3.394 | .296 | | 11.477 | .000 | |
| Computer anxiety | .048 | .076 | .056 | .634 | .527 | R=.364, R ² =.133, |
| Computer confidence | .113 | .100 | .113 | 1.134 | .258 | Modified R ² =.116 |
| Computer preference | -.197 | .100 | -.151 | -1.824 | .070 | F=7.946, P=.000 |
| Computer use ability | -.199 | .078 | -.210 | -2.545 | .012* | |

Dependent variable : Systematicity, **, $p<0.01$, *, $p<0.05$

3.1.6 Effect of Computer Attitude on Maturity

Simple regression analysis was conducted to determine the effect of computer attitudes on maturity (Table 8). The results showed that computer use ability was affecting maturity under statistical significance ($t=-2.583$, $p<0.05$).

Table 8. Effect of computer Attitude on Maturity

| Model | Non-stand. Factor | | β | t | P | Statistics |
|----------------------|-------------------|------|---------|--------|-------|-------------------------------|
| | B | SD | | | | |
| (Constant) | 2.690 | .338 | | 7.955 | .000 | |
| Computer anxiety | -.120 | .087 | -.123 | -1.383 | .168 | R=.227, R ² =.051, |
| Computer confidence | .217 | .114 | .191 | 1.900 | .059 | Modified R ² =.033 |
| Computer preference | .069 | .123 | .046 | .557 | .578 | F=2.819, P=.026 |
| Computer use ability | -.231 | .089 | -.214 | -2.583 | .010* | |

Dependent variable : Maturity, **, $p<0.01$, *, $p<0.05$

4. Conclusion

In modern times, computers are used in almost all areas of real life, and education is no exception. Computer use has become an indispensable means of teaching and learning methods, and computers are indispensable in colleges and universities when writing reports and communicating. In addition, it is required for computer literacy as an essential item to get a job after graduation. But parents are reported to be very worried about whether their children are addicted to computers. As a result, many researches have been conducted on the negative effects of computer use. Computer dependence refers to a disorder in which the computer is used excessively enough to interfere with daily life. As a result, many studies have focused on the causes and solutions of computer addiction, focusing on the problems that can occur in the virtual space of the Internet. But now that computers are deep inside our daily lives, and in the field of education, computers have become an essential tool in various fields including online classes, so we need to check how computers affect learners' perception.

This study was conducted to investigate the effects of computer attitudes such as anxiety, confidence, preference, usefulness, and computer literacy on their critical thinking ability, targeting college students at unspecified university universities. Learner-led experiences in learning were one of the main concerns. This means that learners themselves have the authority and initiative to continuously experience their own

experiences as subjects of learning. For learner-led learning, learners must be equipped for flexibility and self-directed problem solving. What is required of learners in this situation is critical thinking disposition.

As a result of this study, positive attitude toward computer significantly increased some of critical thinking sub-factors disposition. As a result of the analysis, computer liking ($t=2.102$, $p<0.05$) and computer use ability affected Truth seeking ($t=-6.319$, $p<0.01$), computer use ability was affecting analyticity ($t=-5.630$, $p<0.01$), computer use ability was affecting systematicity ($t=-2.545$, $p<0.05$), computer use ability was affecting maturity under statistical significance ($t=-2.583$, $p<0.05$). In conclusion, this study suggests that computer liking and computer use ability affect the sub-factor components of critical thinking disposition, truth seeking, analyticity, systematicity, and maturity, therefore the emphasis of this study is to emphasize that it is desirable to use the computer as a medium of learning based on computer literacy rather than worrying about excessive computer use.

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