The Computer Learners’ Cognitive and Behavioristic Strategies with Motivation

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Abstract

Recently, working in the IT industry has become more and more frequent to non-engineering based developers. We analyzed the data of learners with different learning styles and learning strategies and planned this study to investigate the correlation among various variables. In this paper, a sample of 117 adult IT learners of vocational training institute was surveyed with a questionnaire consisting of 23 questions that can grasp the learning styles of computer learners of various backgrounds, as well as a learning strategy test consisting of cognitive and behavioral control variables. The results of the analysis showed that there was no difference in the learning strategies according to sex and age. It is in the inner motivation-intelectual curiosity and the will of the individual that superior to the instrumental and external purpose of job acquisition. There are differences in the results depending on the willingness of ‘10,000 hour’ rule, and whether or not there are learning coaches and role models. Three factors of meaningful learning strategies include ‘cognitive strategy’, ‘demonstration and memory’, and ‘planning’. It can be applied in the IT learning field of the 4th industry revolution territory such as the Internet of Things, Big Data, AR/VR by training IT workers including data scientists and developers.

Index Terms: learning strategies; learning styles ; data scientist;

I. INTRODUCTION

The Fourth Industrial Revolution, which is addressed at the Davos Forum, introduces several areas that represent a revolution in new fields such as the Internet of Things, Big Data, Augmented Reality, and Smart Manufacturing. Technology is open to anyone, and data scientists in various fields are coming into the spotlight to communicate with open minds, rather than cultivating a group of experts in one field. As reflected in the situation of the times, learners who are not entirely different majors learn the knowledge of the engineering field and work as a profession.

In this paper, we try to find out the relationship between gender and age, project learning, strong synchronization, learning style, and some factors that can affect the learning strategy of computer learner. Using the existing test tools with reliability and
validity, we can identify the relationships among the variables and utilize the advantages of the existing researches, and generalize them and suggest ways to maximize the learning strategies.

II. RELATED WORK

The type of learning is a collective concept that refers to learners' learning habits, learning methods, and learning tips. Learning styles are used to explain individual differences according to learning, to apply appropriate learning environments, teaching tasks, teaching methods and evaluations, and to propose efficient learning environments and encourage academic achievement [1]. According to Kolb, the type of learning is the preferred way of perceiving and processing information coming from outside the learner, and is determined by heredity, past experience, and individual propensity [1-3]. The study of Bandura’s experiential learning outcomes has been studied from a variety of theoretical perspectives in the view of behaviorist, phenomenological, intellectual, willpower, and Vygotsky maternal constructivist perspectives. [4]. Zimmerman defined the learner as a person who participated in the learning process in a superhuman and synchronous, behavioral, and active manner [5-6].

III. DESIGN OF Study Patterns and Learning Strategies

Specific research content includes the types and motivation of computer learners, research on learning styles, and research on learning strategies. The research was conducted as an example of ‘D institute’ of Daejeon. A total of 119 students were surveyed from October 17 to 24, 2014.

A total of 23 questionnaires were used for the study type. Variables are included such as sex, age, learning coaching and role model, and the relationship between these kinds of personal learning contents and learning ability.

In order to measure students’ learning strategies, 52 of the 56 items of cognitive control and behavior control were used, except for 32 items of self-regulated learning test developed by Jung [6]. Data analysis was done using SPSS Statistics 20.0 package. The results of the subjects’ learning strategies were based on descriptive statistics of mean, standard deviation, frequency, and percentage, and t-test and ANOVA were used to test differences in each dependent variable according to general characteristics. In addition, we tried to solve the problem through simple linear regression analysis and multiple regression analysis.

IV. RETRIEVAL OF PROPOSED METHOD

Factors influencing the learning strategy are whether they prepare portfolios before having a job, whether they have experienced the '10,000-hour' rule, and whether they are willing to do it, or whether they have role models. There is a statistically significant positive correlation between cognitive and behavioral control. Cognitive control was used as an independent variable, behavioral control was used as a dependent variable, and periodic analysis was conducted to examine the specific effects of cognitive control on behavioral
control. The overall model predicted behavioral control significantly (F = 89.693, p < .001), and the model R-squared ratio was 43.8%, indicating the relationship between cognitive and behavioral control. In order to examine the specific effects of cognitive control on behavioral control, cognitive control sub-factors (cognitive strategy, demonstration and memory, check, plan) were used as independent variables, behavioral control was set as dependent variable and multiple regression analysis was conducted. The results are shown in Table 1. Overall, the model is statistically significant (F = 25.698, p < .001), and the model summary R squared is 47.9%. 'Cognitive strategy' and 'Demonstration and memory' have a significant effect. Beta values are .507, 'Demonstration and memory' is .195. 'Cognitive strategy' has more influence than 'demonstration and memory'.

Table 1. Cognitive control sub-factor behavior control multiple regression analysis

<table>
<thead>
<tr>
<th>Independent Variables</th>
<th>B</th>
<th>S</th>
<th>E</th>
<th>β</th>
<th>t</th>
<th>p</th>
<th>R2</th>
<th>Adj. R2</th>
<th>F</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cognitive strategy</td>
<td>.517</td>
<td>.109</td>
<td>.507</td>
<td>4.762</td>
<td>.000</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Demonstration and memory</td>
<td>.195</td>
<td>.086</td>
<td>.218</td>
<td>2.271</td>
<td>.025</td>
<td>.479</td>
<td>.460</td>
<td>25.698</td>
<td></td>
</tr>
<tr>
<td>check</td>
<td>-.139</td>
<td>.119</td>
<td>-.142</td>
<td>-1.168</td>
<td>.245</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>plan</td>
<td>.148</td>
<td>.078</td>
<td>.191</td>
<td>1.884</td>
<td>.062</td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>

Dependent variable is behavior control

V. DISCUSSION AND CONCLUSION

The purpose of this study is to analyze and investigate the motivation of the target learners of IT field from other fields and the learning strategy according to the related variables. The main results of this study are as follows.

First, there is no difference in learning strategies by gender and age, and the average of students who prepare for portfolio is superior, suggesting that the learning strategies of motivated learners have developed. Second, the learning strategies of learners who think that they can overcome IT-based majors are superior. The data of learners who have experienced the rule of '10,000 hours' and have a willingness to practice are superior to other classes of data. Third, learners with learning coaches and role models or group study preferences have higher learning strategy averages than other learners. It is a good influence for learners that they have the object of sharing their own problems and difficulties when they learn. Fourth, cognitive control and behavior control, which are components of learning strategy, are correlated. Cognitive strategies, demonstration and memory, and planning are the factors that influence behavioral control during cognitive control.

The significance of this study is as follows. First, what is really needed for computer learners is the learning strategy for transferring technology in related fields. Professional technology is a part that can be acquired beyond age and gender depending on the will,
motivation, and establishment of the sense of purpose. Second, cognitive control and behavior control, which are components of learning strategy, are correlated. Cognitive strategies, demonstration and memory, and planning are the factors that influence behavioral control during cognitive control. It is necessary to develop a learning strategy by controlling the behavior of the above factors. This study can be widely used for students who challenge various fields including high-technology IT industry. In order to generalize the results of the research, we would like to find out the learners of similar environment nationwide and expect further research using various research methods.

REFERENCES