

Title	切り絵の制作活動における初心者を対象とした技能向上支援に関する研究
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Citation	
Issue Date	2020-03-25
Type	Thesis or Dissertation
Text version	ETD
URL	http://hdl.handle.net/10119/16650
Rights	
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I will discuss the improvement of creating skills for creating paper-cuts based on the research in the field of human-computer interaction. In this paper, I aim at the creativity support for the novices to making paper-cutting, which is one of the art creation. I develop the system for measuring the cutting behavior to create a paper-cutting. My knife device with a blade attached to the tip of the stylus measures the user's cutting pressure.

In chapter 4, I experimented with ten beginners and ten experts. I compare the difference in cutting pressure between novices and experts. My results revealed the "difference in skill to control the cutting pressure" and the "pattern difficulty suitable for novices." In Chapter 5, I describe the pressure presentation function developed based on the range of cutting pressure of the expert. I compared the improvement of the skill to adjust the pressure by the existing practice method to evaluate the effect of the system. As a result, the novices who practiced with my system controlled the pressure so that it was cut by the cutting pressure and the variation like the expert. In Chapter 6, I describe the quantitative evaluation of the cutting difficulty. I measure the difficulty level based on the width and the length

of the pattern for cutting. I evaluate the adaptability from difficulty level and skill level. Based on the results, I made a cutting model based on the relationship between each difficulty and cutting time. In addition, I evaluate the practice effect from the change of cutting time through the practice with pictures of various widths. In Chapter 7, I evaluate the skill improvement by balancing the skill and difficulty that combine the system and assessment in Chapter 5 and Chapter 6.

In addition, this experiment evaluates the concentration state by flow theory. The flow theory seems to work on enthusiasm in a stable environment between the high skill level and the high task level showed by Csikszentmihalyi. In this experiment, I created a flow state scale (FSS) for creativity a paper-cutting to evaluate the psychological state of cut picture creation. The flow state scale is based on the questionnaire index for quantitative evaluation of the flow state. As a result, the cutting models showed higher skill improvement than previous systems. In addition, the result with the paper-cutting FSS showed that the participants were in the flow state. From the above results, my system showed a high skill improvement effect with the skill to control the cutting pressure and the

environment construction in difficulty difficult for novices. In Chapter 8, I hold a workshop for creating paper-cutting with my system and evaluate my system usability and the evaluation of the paper-cutting FSS.

In summarizing this research, I confirmed that two factors, the skills required to create creative activities and the level of difficulty to be tackled, had a significant impact on beginners. In addition, I evaluated system development and skill model improvement for users to improve their skills for each task. I am convinced that my research contributes as a foundation to the search for the mechanism of creativity and utilization of knowledge that knowledge science aims at tacit knowledge of expert and novice's psychological change.

keywords:

Cutting, Knife interface, Steerig law, Flow, Supporting practice