

A Pilot Study of Intelligent Robot Aided Education

EunKyoung Lee, YoungJun Lee

Department of Computer Education, Korea National University of Education, Korea
Soph76@hitel.net

Abstract: We investigated elementary students' satisfaction levels of the intelligent robot-aided education. The result showed that students are highly satisfied with robot-aided education. In particular, the satisfaction level with the friend functionality and affective effects of the robot are high. Also, we found that the males' satisfaction level was significantly higher than females'.

Keywords: Intelligent Robot, Robot-Aided Education, Ubiquitous Robot

1. Introduction

Intelligent robots can provide e-learning contents as well as various educational services. In Korea, robot aided education has been studied with 'IRobi Q' as a home tutor[1][2], 'Tiro' as a teaching assistant robot[3]. It was shown that robot aided education enhances children's motivation[4]. A character-type robot, 'Dooly' was introduced in the 'u-class' which is equipped with cutting-edge technological devices to provide experiences of the ubiquitous classroom environment for K-12 teachers and students in Korea Education & Research Information Service[5]. In this study, we carried out a pilot study to investigate the possibility of robot-aided education in the classroom.

2. Purpose and Methods

The purpose of this study is to examine students' and teachers' satisfaction levels of using the intelligent educational robot in a classroom. To achieve this purpose, we surveyed 15 elementary students participated in a robot-aided education and interviewed 2 teachers. Participants are consisted of 15 students of the 4th or 5th grade and 2 teachers. They participated in the robot-aided education for 2 hours per day for 4 days. They used the 'Dooly' as a teaching assistance robot in the 'u-class'. 'Dooly' is the famous Korean cartoon character-type robot developed in Korea.



Figure 1. The Scenes of the Robot Aided Education

3. Results and Discussion

We surveyed the satisfaction levels about the type, size and gender of the robot as general functionalities of the robot. We, also, surveyed satisfaction levels with educational functionalities of the robot and effects of robot-aided education. Students are very satisfied with using intelligent robot in the classroom. The satisfaction level about the educational functionalities are very high. The satisfaction level about the effects of robot-aided education was also high. We executed the MANOVA to analyze the gender differences. The satisfaction level of boy students was significantly higher than that of girls, especially in educational functionalities.

Table 1. The MANOVA Analysis Results

Sources	Dependent variables	SS	df	MS	F
Gender	General Functionalities	1.250	1	1.250	2.260
	Educational Functionalities	.559	1	.559	10.605**
	Educational Effects	.845	1	.845	3.876
	Total	.792	1	.792	18.336**
Error	General Functionalities	6.083	11	.553	
	Educational Functionalities	.580	11	.053	
	Educational Effects	2.398	11	.218	
	Total	.475	11	.043	
Total	General Functionalities	149.333	15		
	Educational Functionalities	197.073	15		
	Educational Effects	196.750	15		
	Total	169.520	15		

Gender: Wilks' $\lambda = .333$ F=4.011*

* p < .05, ** p < .01

Two teachers, who had conducted the robot aided education, were asked what functionalities are useful for effective teaching and what functionalities should be prepared in the future. They identified that interaction functionalities might be useful to support effective teaching and learning. They also thought that the functionalities of taking pictures and videos would monitor their students and it is useful for managing the classroom. Concerning the functionalities of the robot, they said that the robustness of the robot, the functionality to regulate the speed of the robot and the functionality to generate a natural voice would be needed.

4. Conclusion

In this study, we performed robot-aided education in a real classroom and surveyed the satisfaction levels of robot-aided education. Students are highly satisfied with robot-aided education. The results of this study will help developers and researchers who want to apply intelligent robots in the school classroom.

References

- [1] IRobiQ.(2007). WHAT IS IROBIQ?. Retrieved December 17, 2007, from <http://www.irobibiz.com>
- [2] KAIRA: Korea Advanced Intelligent Robot Association.(2007). URC. Retrieved December 17, 2007, from <http://www.urclife.or.kr>
- [3] Hanool-Robotics.(2007). Retrieved December 17, 2007, from <http://robotics.co.kr>
- [4] Han, J., Jo, M., Park, S., & Kim, S.(2005). The Educational Use of Home Robots for Children. *Proceeding of IEEE International Workshop on Robots and Human Interactive Communication, Aug. 2005*, Nashville, 378-383.
- [5] Lee, Y., Kim, K., Yu, H., Lim, W., Kye, B., and Ko, B. (2007). *A Study on the Educational Application of Intelligent Robots and Appropriate Functionalities of Educational Robots(KR 2007-26)*. Seoul: Korea Education and Research Information Service.