

# The role of the Lego MindStorms in introductory Computer Science Education

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## Introduction

The focus of our research was a survey of the use of the Lego MindStorms in introductory Computer Science courses at the collegiate level. In recent years, a number of CS educators have determined that introductory courses require more student interaction. As a result, a number of educators have introduced Lego MindStorms, interactive robots with a publicly available programming platform into their classes. We are bringing together the research and experience of the leaders in the field to offer direction for future work. We offer a tutorial on the capabilities of the Lego MindStorms, review the use of the Lego MindStorms in the CS classroom, and review subjective and objective studies on the effectiveness of the Lego MindStorms in the

## Background

There has been widespread belief that the use of robots in CS education offers a tangible, cause and effect experience with programming to engage students in the learning process. The Lego MindStorms provide an excellent option due to their robust design, availability of replacement parts, programmability, and the fact that users did not need extensive knowledge of hardware to use them. There have been several theories regarding the best way to implement their use in introductory programming classes. The underlying question remains: how can the MindStorms be used to have a positive effect in teaching basic computing?

## Conclusions

We have brought together research, experience and a shift in pedagogic vision for the future in introductory Computer Science education. According to the leaders in the field, the MindStorms are a valid tool that can be used in introductory Computer Science education. Our research has focused on how the MindStorms have been used, identified issues that have arisen, such as poor representation of certain concepts and explored the work that has been suggested to use the MindStorms effectively. Combining the results of the study with the vision of the shift in teaching style may very well set the course for future studies. It is the emphasis on concepts first before laboratory projects that lays the path.