

## Call for book chapters

**Book name:** Educational robots: Design Methodologies and Applications

**To be published in:** Springer Smart Computing and Intelligence series  
(<https://www.springer.com/series/15620>)

### Background

Robots have slowly started to be integrated in our society, where in 2008 the number of service robots has already surpassed the number of industrial robots (IFR International Federation of Robotics Statistical Department, 2008). Between the years of 2014 and 2015, robot sales significantly increased by 25% in the field of professional service, and by 16% in the personal service field (IFR International Federation of Robotics, 2016). This enabled the deployment of robots in several domains, including industry and military (Gallagher, Nåden, & Karterud, 2016), elderly people's domestic life (Frennert, 2016), and education (Benitti, 2012). Specifically in education, IFR International Federation of Robotics (2016) expected that over three million robots will be sold for educational and research purposes between the years 2016 and 2019.

With the several features that educational robots have, including interactivity, flexibility and possibility of doing the same task repetitively, they became useful educational tools (Chang, Lee, Po-Yao, Chin-Yeh, & Gwo-Dong, 2010). Additionally, they have been proved to support 21st Century skills (Eguchi, 2014), as well as facilitate the development of abstract thinking and collaborative problem-solving skills (Bredenfeld, Hofmann, Steinbauer, 2010; Catlin & Balmires, 2010).

While the field of educational robotics is rapidly advancing, several questions remain unanswered (Cheng, Sun, Chen, 2018), such as how to integrate robots in the learning process? And, what are the urgent and important usages of robots in education? Currently, no framework is proposed for helping researchers to effectively design educational robots. This can hinder the integration of robots in education. Additionally, opinions regarding the use of educational robots in disabled contexts are still contradictory (Wolbring & Yumakulov, 2014). This raises the need for further investigation about educational robots integration in

special needs education. Furthermore, Serholt (2017) stated that it is important to investigate how children should interact with robotic tutors and what happens when robotic tutors are implemented in education, as limited studies focused on this issue. Particularly, more investigation is needed to effectively use educational robots, as tutors, in the learning process from the following four dimensions: (1) Application needs: It is important to analyze and understand the needs for educational robots as tutors in education, from different views, including students, parents, educators and researchers; (2) Pedagogical design: It covers how learning experiences are designed and what teaching strategies are used with educational robots to help students' learning; (3) Assessment/Evaluation: It covers how educational robots can assess/evaluate the students to stay up to date with their learning weakness and progress; and, (4) Impacts on education system: How educational robots would affect learning process and outcome, learning behaviors and school operations and managements.

## **Focus & Scope:**

This book focuses on, but not limited to, the following topics:

### Design methodologies

- Framework of integrating robots in education
- Design methodology for educational robots
- Robot-children interaction in education
- Pedagogical designs of educational robots
- Educational robots and Social interactions
- Educational robots as Teacher, Tutor, Teaching assistant and Peer.
- Evaluation/Assessment using educational robots in education
- Educational robots design and individual differences

### Applications

- Application needs analysis for educational robots
- Educational robots in special needs education
- Educational robots in STEM education
- Educational robots for personalized learning
- Educational robots for language learning
- Educational robots for skill-based training

- Educational robots and century skills
- Educational robots and adaptive learning
- Edutainment robots

## **Editors**

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## **Submission Process**

All chapters should be submitted directly via email to the editors:

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## **Important Dates**

- Full chapter submission: October 15, 2019.
- 1st round of reviews sent to authors: 30 December, 2019.
- 2nd version of chapters: 5 February, 2020.
- 2nd round of reviews (Final comments/edits): 20 March, 2020.
- Camera ready chapters: 20 April, 2020.

## **References**

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