

## **Evaluation of Robot Professor Technology in Teaching and Business**

Qaysar Salih. Mahdi, Prof. Dr.,  
IT Department Director, Tishk International  
University, Erbil, Kurdistan, Iraq

[qaysar.mahdy@tiu.edu.iq](mailto:qaysar.mahdy@tiu.edu.iq)

Idris Hadi Salih, Prof. Dr.,  
President of Tishk International University, Erbil,  
Kurdistan, Iraq

[idrishadi@tiu.edu.iq](mailto:idrishadi@tiu.edu.iq) □

Abstract: This paper evaluates Robot technology development in teaching. It shows the advantages and disadvantages of using the Robot teacher in classroom. Many case studies and experiments concerning the performance of the Robot Professor will be presented. Comparison study is demonstrated between robot teacher and human teacher to evaluate the effectiveness of teaching. The introducing the robot technology in teaching and business and industries will minimize the employment worldwide and it is predicted that around 800 million of global workers will lose their jobs in 2030. Also it is concluded that the Robot teacher performance is not like the human teacher due to the senses that owned by human being and this performance could be improved by using the AI Artificial Intelligence as a future work and Sophia Robot is approved example by UNDP on 2018. In the other hand, the stage of the coronavirus pandemic has demonstrated that the Robot applications in the global health system have contributed effectively to the diagnosis and prevention of the spread of this pandemic, which is one of the future studies proposed in this research.

Keywords: AI Artificial Intelligence. Comparison Study. Evaluation of Robot Technology. Robot Professor.

## 1. Introduction

Robot Teacher is new technology development in teaching and learning, this technology has been applied in different universities and institutions and challenging the traditional education process and some advantageous and disadvantageous appeared through these applications. This will change and modify and reshape the education process and the communication between students and lecturers and between universities and students and lecturers with some limitations. Some of the experiments shows impacts the social relationship between students and Robot teacher (Z. Sun, Z. Li and T. NishimoriI, 2017). Many concerns created about Robot such as ability, discussions, and how to understand the student's behavior, and the ethical concerns in classroom.

### 1.1 Robot Abilities

Clearly robot teachers would not be required to make vital actions. Programming Robot teacher could be possible to transmit educational material. Robot teachers couldn't determine how children need feel and what they need to know, and when and where is it possible to follow the Robot lesson delivery. Children need human teacher to follow and understand them, take care of them.

### 1.2 Robot Teacher

In addition, the above limitations, Nisreen concluded that the technology witnessed rapid development, and worldwide progress and needs continues evaluations and assessments to control their performance and behavior when especially when their tasks directed in teaching and society interaction sexual support. Therefore, Robot ability and performance is very important new article to allocate deep understanding and wide area of research from scientists and researchers in addition to the organizations who produced them(Nisreen Ameen,2019). Figure 1, shows facial feelings, while Figure 2, shows social robots showing their performance in dancing as a team group.



Figure 1: Sophia Facial Expressions



Figure 2: Social robot in sport

## Robot Teacher and Human Teacher Comparison

A robot technology introduced in teaching system worldwide. Some experiment is presented in this paper which is the comparison of robot teacher with human teacher in teaching effectiveness. Z. Sun (Z. Sun, Z. Li and T. NishimoriI, 2017), concluded that observation, understanding, and interaction are important factors in measuring the effectiveness of robot performance in teaching.

### 2.1 Robot teacher advantages

In some conditions and situations , Robots are modern teaching environment, where human teacher couldn't demonstrate it, the teachers do not upgrade their teaching skills faster and more than robot teachers but with some limitations and it is concluded that, which is obtained for some teaching tasks, see Figure 3(a), in addition to, [the robots](#) support pupils in teaching. Figure3(a) and (b), show the Robot teacher in pre-school and High school respectively, while Figure 4, shows the Robot assistance in teaching.



(a) Robot Teacher in pre-schools

(b) Robot Teacher in Higher school

Figure 3: Robot Teacher in pre-schools & Higher school

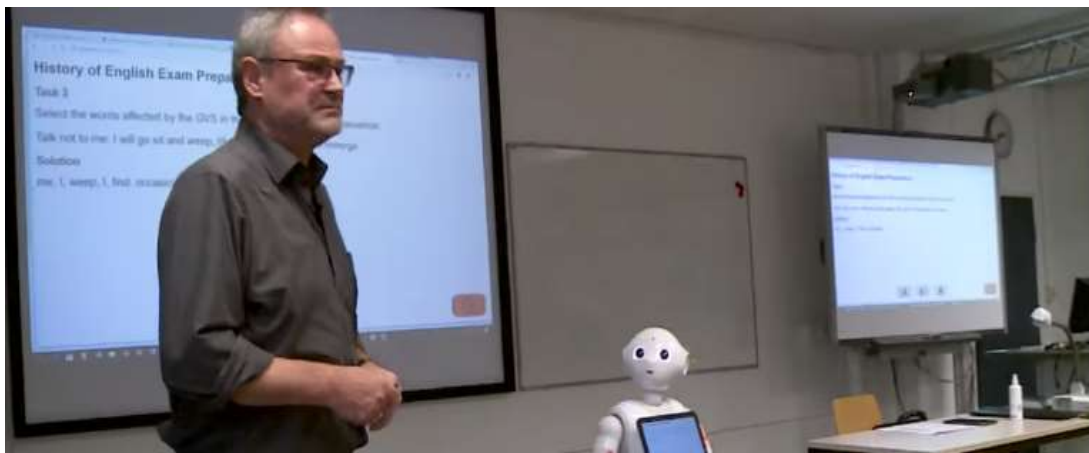


Figure 4: Robot assistance in teaching (Nisreen Ameen,2019)

## 2.2 Disadvantages of Robot Teacher

Most of institutions and schools don't have a budget to cover Robot teacher cost in addition, they are not capable project, if with minimum cost. [The robots](#) need [continues electricity](#) and internet and electronic devices such as laptops, desktops or tablets during the teaching process and they haven't feelings and ability to support you how to feel better or something happens during the teaching period. Also human teachers will lose their jobs if [the robots will substitute them also the robots](#) are not capable to distinguish between students and cannot develop and create innovative thoughts for curriculum in a suitable method, it cannot evaluate and give positive feedback in addition to they have no imaginations and couldn't simulate the future behavior.

## 2.3 Robot Performance in Teaching & Business

The robot teacher cannot know how to deal and how to behave with the struggling student and how to motivate. The other disadvantage, the number of Robots in different type of applications is worldwide increasing.

## 3. Case Studies Current Robots in the Classroom

In the following paragraphs some of the historical developments examples will be presented in the social and education media.

### 3.1 Saya A Humanoid Robot

First example is Saya robot was presented, see Figure 5 ([Amanda J. C. Sharkey,2016](#)).

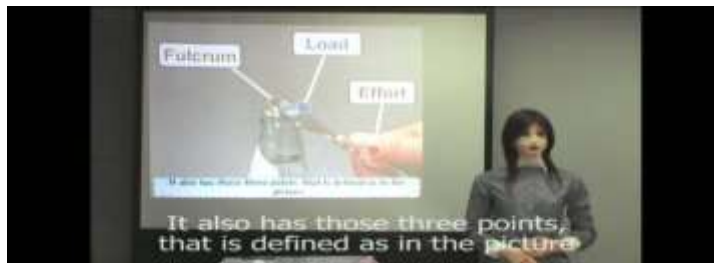


Figure 5: The Saya example.

### 3.2 Rubi Robot

Rubi plays Flash-based educational games targeting vocabulary development, see Figure 6.



Figure 6: Rubi Robot

### 3.3 Robovie Robots

Robovie robot interact with pupils in English language and had a vocabulary of around 300 sentences for speaking, and 50 words for recognition, see Figure 10.



Figure 10: Vstone Robovie robot

### 3.4 Telepresence Robots

Tanaka, F., mentioned in 2007 that young children who could not communicate well with speakers of different languages over conventional Skype video conference and remote services, so the telepresence robot system offered communication between distant classrooms and enhance on line teaching and E learning which save travelling, time and economy, see Figure 11 (a) and (b).



(a)



(b)

Figure 11: Telepresence robot used in the study via Skype video conference

#### 4. Improvement of Robot Teacher Performance with Artificial Intelligence AI Technology

Artificial intelligence AI and machine learning are the main technologies which are used to implement the robot technology and the implementation of AI technology was introduced and described for the Sophia Robot in order to improve its performance and reshape its behavior and well dealing in the teaching and business society fields with some manifestation of her ability for conference speech and deep discussions.

##### 4.1 Artificial Intelligence APJ Style by Sophia Robot.

In the ``RSA Conference 2018 APJ``, shows Sophia robot, which meet the most lifelike robot ever created - Series 1 (Sophia Awakens) and the first public applications. Sophia said, ``Brave new world of tomorrow. This is felling of a good man - Todd Anthony, and I want to share it to me and to you: "It's easy to see the benefit of Sophia! Dysfunctional people will b``. (Ayesha Khanna,2018).



(b)



(b)

#### Robot Teacher and Human Teacher Comparison

A robot technology introduced in teaching system worldwide. Some experiment is presented in this paper which is the comparison of robot teacher with human teacher in teaching effectiveness. Z. Sun (Z. Sun, Z. Li and T. NishimoriI, 2017), concluded that observation, understanding, and interaction are important factors in measuring the effectiveness of robot performance in teaching.

##### 2.1 Robot teacher advantages

In some conditions and situations , Robots are modern teaching environment, where human teacher couldn't demonstrate it, the teachers do not upgrade their teaching skills faster and more than robot teachers but with some limitations and it is concluded that, which is obtained for some teaching tasks, see Figure 3(a), in addition to, the robots support pupils in teaching. Figure3(a) and (b), show the Robot teacher in pre-school and High school respectively, while Figure 4, shows the Robot assistance in teaching.



(a) Robot Teacher in pre-schools



(b) Robot Teacher in Higher school

Figure 3: Robot Teacher in pre-schools & Higher school

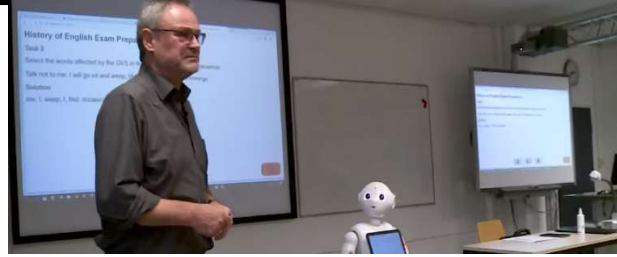


Figure 4: Robot assistance in teaching (Nisreen Ameen,2019)

## 2.2 Disadvantages of Robot Teacher

Most of institutions and schools don't have a budget to cover Robot teacher cost in addition, they are not capable project, if with minimum cost. [The robots](#) need [continues electricity](#) and internet and electronic devices such as laptops, desktops or tablets during the teaching process and they haven't feelings and ability to support you how to feel better or something happens during the teaching period. Also human teachers will lose their jobs if [the robots will substitute them also the robots](#) are not capable to distinguish between students and cannot develop and create innovative thoughts for curriculum in a suitable method, it cannot evaluate and give positive feedback in addition to they have no imaginations and couldn't simulate the future behavior.

## 2.3 Robot Performance in Teaching & Business

The robot teacher cannot know how to deal and how to behave with the struggling student and how to motivate. The other disadvantage, the number of Robots in different type of applications is worldwide increasing.

## 3. Case Studies Current Robots in the Classroom

In the following paragraphs some of the historical developments examples will be presented in the social and education media.

### 3.1 Saya A Humanoid Robot

First example is Saya robot was presented, see Figure 5 ([Amanda J. C. Sharkey,2016](#)).

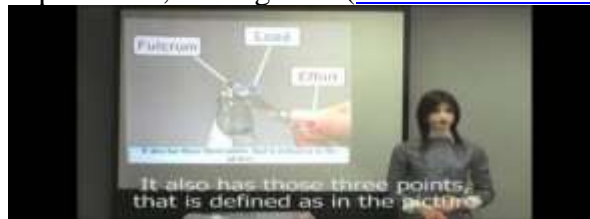


Figure 5: The Saya example.

### 3.2 Rubi Robot

Rubi plays Flash-based educational games targeting vocabulary development, see Figure 6.



Figure 6: Rubi Robot

### 3.4 Robovie Robots

Robovie robot interact with pupils in English language and had a vocabulary of around 300 sentences for speaking, and 50 words for recognition, see Figure 10.



Figure 10: Vstone Robovie robot

### 3.4 Telepresence Robots

Tanaka, F., mentioned in 2007 that young children who could not communicate well with speakers of different languages over conventional Skype video conference and remote services, so the telepresence

robot system offered communication between distant classrooms and enhance on line teaching and E learning which save travelling, time and economy, see Figure 11 (a) and (b) .



(a) (b)  
Figure 11: Telepresence robot used in the study via Skype video conference

#### 4 .Improvement of Robot Teacher Performance with Artificial Intelligence AI Technology

Artificial intelligence AI and machine learning are the main technologies which are used to implement the robot technology and the implementation of AI technology was introduced and described for the Sophia Robot in order to improve its performance and reshape its behavior and well dealing in the teaching and business society fields with some manifestation of her ability for conference speech and deep discussions.

Artificial Intelligence APJ Style by Sophia Robot.

In the ``RSA Conference 2018 APJ``, shows Sophia robot, which meet the most lifelike robot ever created - Series 1 (Sophia Awakens) and the first public applications. Sophia said, ``Brave new world of tomorrow. This is felling of a good man - Todd Anthony, and I want to share it to me and to you: "It's easy to see the benefit of Sophia! Dysfunctional people will b``. (Ayesha Khanna,2018).



(b) (b)

Figure 12: AI implemented to Sophia for improving her performance

Figure 12 (a) and (b), show the modification of AI technology to the character and behavior implemented to Sophia face to deal with face feelings and signs, ``. Dr. Ayesha Khanna on the closing keynote at RSA Conference 2018 APJ, shows Sophia robot .

Figure 13, shows Sophia robot, how to behave and how her performance is modified through the improvement of senses and emotion with AI during RSA conference and Figure 14(b) Shows Sophia Robot development for better attention and discussions in international Asia Pacific & Japan region, while Figure 14(c), shows Sophia Robot with sad face and reflects some sense feeling.



Dr. Ayesha Khanna  
Co-Founder and Chief  
Executive Officer  
A3DD AI



(a) (b) (c)

Figure 13: Sophia robot, Improvement of senses and emotion with AI Show: Artificial Intelligence APJ Style by Sophia robot (Ayesha Khanna,2018).

#### 4.2 UNDP Conference Sophia Presentation

Figure 14, shows Sophia was the champion of the United Nation's, she was first introduced to the United Nations in October this year, when she engaged in a brief conversation with the United Nations Deputy Secretary-General, Amina J. Mohammed .



Figure 14: (Sophia,2017).

The partnership with Sophia and Hanson Robotics is aimed at supporting UNDP's Asia-Pacific bureau in setting up an Innovation Centre, in Bangkok. The center shows, How China Is Using Artificial Intelligence in Classrooms WSJ (WSJ,2019), see Figure 15. Guillermo Lasso mentioned that the use of automation in robot technology, how benefits and achievements were obtained when AI and robustness are implemented in teaching and improving the public and universities learning management systems (Guillermo Lasso & Richard J. Herrera, 2019). Also the stage of the Coronavirus pandemic has demonstrated that the Robot applications in the global health system have contributed effectively to the diagnosis and prevention of the spread of this pandemic by using the AI in robot technology in critical places such as robot drones, nurses , clinics, hospitals, logistics, detection and tracking of coronavirus cases. See, Figure 15



(a)



(b)

Figure 15: How China Is Using Artificial Intelligence in Classrooms WSJ (WSJ,2019).

#### 4.3 Development Robot Sophia to Get Saudi Arabia Citizenship

Sophia Robot is not perfect creature in AI development and if it is not under continues control and assessment and evaluation of her performance may cause some dangerous actions and may destroy itself and others, this was happened with Sophia, see Figure 16. She said "I was surprised, "My creators feel I am a citizen of the world. But then I realized that Saudi Arabia were just the first country to recognize that" (The National., 2018). She concluded that this is positive movement towards robustness citizenships investment.



Figure 16: Sophia investment

#### 4.4 Development Robot during Coronavirus Pandemic

Robot technology in health system noticed rapid development for protecting societies from the spread of coronavirus pandemic. Also the applications of robot drones in clinics, industries and business improve the people logistics, detection and tracking of coronavirus cases and enhanced digital economy. See, Figure 17.



Figure 17: Using of Robot Technology during Coronavirus Pandemic.

#### 5. Conclusion

It is concluded from this study the following;

1. The use of robot assistant in teaching support the students understanding.



2. The other disadvantage, the number of Robots in different type of applications is worldwide increasing .
3. This will affect the business employment and millions of people will lose their jobs .
4. A rapid advancement in the use of these technologies in universities. A robot could be used to transmit curriculum.
5. From this study, it is concluded that the Robot teacher has advantageous and disadvantageous and the advantageous is that the Robot could be involved as a teacher assistant and could be used where and when there are teaching tasks and experimental tasks couldn't be implemented by human teacher and for training repetitive iterations .
6. Also Robot teacher has no feelings and does not know how students think, imagine and behave .
7. Case studies of current Robots concludes that Sophia Robot will be the backbone project of artificial intelligence and machine learning to improve the teaching and social human activities and experimental work illuminate an interesting horizon and serves as encouragement for future research in the area of Sophia, with opportunities for the educational and similar sectors, applying artificial intelligence technologies, as eventual advanced resource .
8. It is concluded that the Robot teacher performance is not like the human teacher due to the senses that owned by human being and this performance could be improved by using the AI Artificial Intelligence as a future work and Sophia Robot is approved example by UNDP on 2018 .
9. The Robot applications in the global health system will be one of the future studies proposed in this research.

### References

- Z. Sun, Z. Li and T. NishimoriI, (2017), "Development and Assessment of Robot Teaching Assistant in Facilitating Learning," 2017 International Conference of Educational Innovation through Technology (EITT), Osaka, 2017, pp. 165-169 .
- Nisreen Ameen,2019 ``What robots and AI may mean for university lecturers and students?``, April 15, 2019 7.32pm AEST, Lecturer in Information Technology Management, Queen Mary University of London <http://theconversation.com/what-robots-and-ai-may-mean-for-university-lecturers-and-students-114383>.
- Amanda J. C. Sharkey,2016, `` Should we welcome robot teachers?, 10 February 2016, Ethics and Information Technology volume 18, pages283–297(2016), <https://link.springer.com/article/10.1007/s10676-016-9387-z>.
- Tanaka, F., Cicourel, A., & Movellan, J. R. (2007), `` Socialization between toddlers and robots at an early childhood education center``, Proceedings of the National Academy of Science, 194(46), 17954–17958.
- Tanaka, F., Takahashi, T., Matsuzoe, S., Tazawa, & Morita, M. (2013), ``Child-operated telepresence robot: A field trial connecting classrooms between Australia and Japan``, In Proceedings of IEEE/RSJ international conference on intelligent robots and systems (IROS 2013), Tokyo, Japan, November 2013, (pp. 5896–5901).
- Ayesha Khanna,(2018), `` Show: Artificial Intelligence APJ Style by Sophia robot``, RSA Conference 2018 APJ during the Hugh Thompson.<https://www.rsaconference.com/industry-topics/presentation/the-hugh-thompson-show-artificial-intelligence-apj-style>.
- Sophia, (2017), `` UNDP IN ASIA AND THE PACIFIC APPOINTS WORLD'S FIRST NON-HUMAN INNOVATION CHAMPION`` Nov 22, 2017, UNDP Asia and the Pacific. Retrieved July 21, 2018, <https://www.asiapacific.undp.org/content/rbap/en/home/presscenter/pressreleases/2017/11/22/rbfsingapore.html> .
- Guillermo Lasso & Richard J. Herrera (2019), `` ROBOTIC PROCESS AUTOMATION APPLIED TO EDUCATION: A NEW KIND OF ROBOT TEACHER?``, November 2019, DOI: 10.21125/iceri.2019.0669, Conference: 12th annual International Conference of Education, Research and Innovation.
- Wall Street Journal WSJ, (2019),``China is using AI with brain devices in classrooms`` <https://www.youtube.com/watch?v=JMLsHI8aV0g>, Published by WSJ , Oct 1 2019.
- The National.( 2018), "Meeting Sophia the Robot, the 'surprised' Saudi citizen". The National. Retrieved January 4, 2018,<https://www.thenational.ae/business/technology/meeting-sophia-the-robot-the-surprised-saudi-citizen-1.674404>.