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THE IMPACT OF EDUCATIONAL TECHNOLOGY ON PERFORMANCE

SUNAYANA MANOJ KAIBILIRA
Researcher-United Arab Emirates

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ABSTRACT

While utilitarian robots are highly valued by every developed country, it is essential to consider their impact and relevance in the field of academics. It is interesting and enervating to observe students experimenting with artificial intelligence at every phase of their academic life and career. Due to the far-reaching capabilities of versatile robots and artificial intelligence, it is necessary to teach students in higher education about the moral and ethical connotations. It is the need of the hour to empower them with technological vocabulary that is suitable for present day circumstances. This small-scale study strives to explore the possibilities of developing a technological repertoire of vocabulary that may help students not to become too dependent on artificial intelligence.

Introduction

One of the most significant recent advances in robotics research is the development of collaborative robots, also known as cobots. These cobots are designed to work alongside humans in shared workspaces, and they are equipped with sensors and cameras that allow them to adapt to their environment and interact safely with humans (Rochat & Stampfli, 2020). This development has opened up new possibilities for robots to assist in manufacturing, healthcare, and other industries.

Another important area of robotics research is the development of autonomous robots. Autonomous robots are designed to operate independently without human intervention, and they are equipped with sensors and algorithms that allow them to perceive and navigate their environment (Siegel et al., 2019). Autonomous robots have the potential to transform many industries, including logistics, agriculture, and transportation.

Many studies have investigated the effectiveness of educational robots in promoting learning outcomes in various fields. For example, a study by Huang and Liang (2020) found that using a humanoid robot in a math class increased students' motivation and engagement, resulting in improved learning outcomes. Similarly, a study by Alimisis et al. (2019) found that using educational robots in a science class enhanced students' understanding of abstract concepts and improved their scientific reasoning skills.

Several factors can influence the use of educational robots in classrooms, including teacher attitudes, student characteristics, and technological infrastructure. For example, a study by Liu et al. (2020) found that teacher attitudes toward educational robots were positively correlated with their use in classrooms. Additionally, a study by De Graaf and All (2019) found that student characteristics, such as age and gender, can influence their engagement with educational robots.

The current study focused on a key question that is embedded in an academic context.

Are technological prompts and tasks given to students successful in bolstering their futuristic workplace vocabulary?

Null Hypothesis 1 : Technological prompts and tasks on robotics are irrelevant in academic contexts.

Hypothesis 2: Technological prompts and tasks on robotics are necessary to develop futuristic workplace vocabulary and are relevant in academic contexts.

The study was conducted in a private university for the duration of two semesters and the outcome has been presented through the findings and discussion.

Rationale

Educational robots have become increasingly popular in recent years due to their potential to enhance learning experiences in various fields, such as mathematics, science, and engineering. These robots are designed to engage students in interactive and experiential learning activities, which can improve their critical thinking and problem-solving skills.

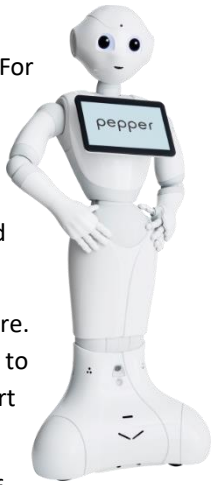
It is important to note that EAP or ESP students struggle to know and understand the genre approach which is an underlying part during the process of writing. As it is necessary in an academic context, instructors may be determined to assist students in gaining mastery over the nuances of writing. However, faculty cannot be complacent that students know how to interpret ideas, organize and express themselves using the target language. Two erudite researchers Al Khairy (2013 ; 5) and Seidlhofer {2005 ; 340) have explored the academic arena and found that EFL students can be considered as "very weak" in terms of "organization of their thoughts" and creative ideas. This situation needs to be redressed.

The Academic Word List (AWL) has been recommended by Coxhead (2000) as it can be advantageous to improve the vocabulary of students in higher education. The study conducted by Kaur and Ganapathy (2017) on the importance of using the AWL has been taken into serious consideration.

Banister (2016) has suggested that the AWL can be a valuable tool in helping learners to concentrate on vocabulary terms which are worth learning for contexts which are discipline specific. Meanwhile, it is necessary to reflect on the fact that students need to become familiar with current technological vocabulary as they will need to use it extensively for their higher studies. Knowing technological terms and expressions may be relevant in an academic context and succeed in giving students an edge at the workplace.

Literature Review

Educational robots are designed to offer dynamic, interactive, and engaging learning experiences for learners. In this literature review, we will explore one of these educational robots, the ways in which it has been used in educational settings, and its effectiveness.



Several studies have explored the effectiveness of educational robots in education. For example, a study conducted by Kennedy, Cutts, and Finkelstein (2017) found that educational robots were effective in teaching programming concepts to adult level students

Pepper is a humanoid robot developed by Softbank Robotics. Pepper is designed to interact with humans using natural language processing and facial recognition technologies. It could be interesting to examine some of the recent research on Pepper and its potential applications.

One of the most significant recent studies on Pepper focused on its use in healthcare. Researchers at the University of Bedfordshire in the UK developed a system that uses Pepper to interact with patients in a hospital setting. The system was designed to provide emotional support and gather information about patients' health and wellbeing (Xu et al., 2018).

Another study focused on Pepper's use in education. Researchers at the University of Michigan developed a system that uses Pepper to teach children about the human body. The system was

designed to be interactive and engaging, and the researchers found that children who used the system had a better understanding of human anatomy than those who did not (Kory-Westlund et al., 2016).

Pepper also has the potential to be used in customer service and retail settings. Softbank Robotics has developed a range of applications for Pepper that allow it to greet customers, answer questions, and provide information about products and services. A number of companies have already begun using Pepper in their stores and offices (Softbank Robotics, 2021).

Despite the potential applications of Pepper, there are also concerns about its impact on society. Some worry that humanoid robots like Pepper may be used to replace human workers in a range of industries. Others are concerned about the potential for robots like Pepper to be used for surveillance or other malicious purposes (Moor, 2017).

Despite these concerns, there is no doubt that Pepper will continue to be a major area of research and development in the coming years. As more applications are developed and more data is collected, the potential applications of Pepper and other humanoid robots will only increase.

Methodology

This longitudinal study was carried out on two groups of students who were enrolled on a freshmen composition course. This is an older study but it is applicable to the forthcoming decade that will see a boom in technology. The targeted composition course was based on an American curriculum model and was a general education requirement. The course constituted of students from various disciplines such as Engineering, Interior Design, Business and Architecture. Both the study groups were given prior information on being a part of this small-scale research and consent forms were signed. The fall semester section was considered as the control group while the winter semester section was considered as the treatment group. Both the groups were asked to brainstorm and later they were instructed to write an essay on a topic related to technology. This was a part of the pre test and the results of this test on both groups yielded almost similar results. It was observed that both the groups exhibited some limitations in vocabulary related to technology. Most of the students were not confident during the brainstorming sessions.

According to the adopted methodology, instructional support was extended in the classroom. Students in the treatment group were exposed to topics related to technology throughout the semester. Some of them had a chance to interact with Pepper robot on campus during an International conference and share their perspectives in the classroom. In addition, they were shown videos on Pepper robot and asked to glean some research-based information on it. Furthermore, students in the treatment group did some brainstorming on Pepper robot. Moreover, a class debate on AI was conducted; these students had an opportunity to observe an intercollegiate debate championship on the benefits and dangers of Artificial intelligence. However, the same method was not adopted for the control group. While the control group was given instructional support throughout the semester with academic prompts, they were not exposed to any topics on technology.

Findings

Initially, both the groups were given a brainstorming task that they needed to complete in small groups. Each sub group had 5 students and their group performance was taken into consideration while calculating the percentage. Later, students were required to write an argumentative essay on technology. The results of the pretest were closely similar for both groups. While the first student group took up 25 minutes to complete an essay, the second student group completed it within 28 minutes.

Results of the Pre test

Both the study Groups		Class scores for the brainstorming task / 10%	Approximate time spent on the writing task.	Class scores for the writing task / 10 %	Total Scores/20%
1st group	Control group (n = 20)	4%	25 minutes	5%	9%
2nd group	Treatment group (n=20)	5%	28 minutes	4%	9%

The pretest evaluation revealed a minor difference in brainstorming as well as the writing skills of the study groups. It appeared that the control group did better by a slight margin. However, overall scores provided evidence that their performance was almost the same and there were shortcomings in the usage of vocabulary. Both the groups had to overcome vocabulary hurdles.

Results of the Post Test

Both the study Groups		Class scores for the brainstorming task	Approximate time spent on the writing task	Class scores for the writing task / 10%	Total Scores / 20%
1st group	Control group (n = 20)	6%	30 minutes	6%	12%
2nd group	Treatment group (n=20)	8 %	25 minutes	9 %	17%

The posttest was a brainstorming activity for both the groups and the writing task was an argumentative essay. The time allocated was the same as delineated during the pretest. However, there was a vast difference in the outcome. Both the student groups in the current study were exposed to the AWL. However, their performance was dependent on the amount of exposure they had received to technological terms and expressions through vocabulary.

Discussion

One of the most significant benefits of educational robots is that they offer learners an opportunity to experiment with concepts and ideas in a safe and controlled environment. This promotes critical thinking, problem-solving, a richer vocabulary and creativity. Additionally, educational robots can be used to teach learners social skills, such as teamwork, communication, and empathy.

It is imperative to note that during the post test, the control group gained moderate scores in the brainstorming session but the treatment group was familiar with technology and completed the brainstorming activity in half the time. While the control group used the full 30 minutes that was allocated for the writing task, the treatment group used 25 minutes to complete their argumentative essays. There was a significant difference in the way they approached the task and the manner in which they addressed the issues surrounding technology. While the treatment group did very well, the control group floundered. Therefore, Hypothesis 2 has been proved that technological prompts and tasks on robotics are relevant in academic contexts to develop futuristic workplace vocabulary.

Robots have the potential to revolutionize many industries and aspects of daily life, but they also raise a number of ethical and social concerns. For example, some worry that robots may lead to job displacement for humans, while others are concerned about the safety and security of autonomous robots (Sharkey & Sharkey, 2010). There are also concerns about the potential misuse of robots, such as for surveillance or as autonomous

weapons (Noorman & van Wynsberghe, 2018). Although, these issues are worrying, the field of robotics will continue to be a major area of research and development in the coming years. As robots become more advanced and sophisticated, the potential applications of robotics may become stupendous in value.

Conclusion

This experimental study transformed the way technology is perceived in the classroom atmosphere. Most of the enthusiasm seen in the students was due to the fact that Pepper robot was very attractive and had a humanoid appeal. Students did not feel that the study of technological vocabulary was cumbersome. The study was successful in motivating students and increased the level of student engagement. Many of the students were positive about using robotic technology and did not feel that it was a threat or a danger to society. On a final note, it is particularly relevant to develop vocabulary related to technology through academic writing as students will be required to use this kind of vocabulary at the workplace. Therefore, technological vocabulary may not only serve the purpose in academic contexts but will be indispensable in the future. Activities that are enjoyable and revolve around humanoid robots like Pepper can indeed be educational as they will provide the necessary scaffolding without exerting any undue pressure on the students.

Educational robots have certainly become valued specimen in educational settings. They offer an opportunity for learners to experiment with concepts and ideas in a protected and controlled environment. This in turn promotes critical thinking, problem-solving, and creativity. Additionally, educational robots can be used to teach learners social skills such as teamwork, communication, and empathy. Several studies and Pepper robot have demonstrated the effectiveness of educational robots in enhancing student performance. As a result, educational robots will continue to play an important role in education in the future.

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