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TELEPRESENCE ROBOTS AS A STUDENT AND AS A TEACHER IN CLASSROOMS

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Research Interests and Experiences About the Topic:

Fatma Güneri is actively pursuing a research on students online learning experiences since Covid-19 has started. This study attempts to determine the challenges that students have faced during their online sessions due to the pandemic by applying data observations, pre-studies, and data that has been collected through an online questionnaire. The paper "An Exploratory Study on the Pedagogical and Mental Difficulties Faced by Students during the Pandemic Period of 2020-2021" presenting the first results of this study is accepted by the journal Research on Education and Media. Furthermore, her research interests are focused on the third places (fablabs, coworking spaces etc.), remote working and visualisation of work space data. On 2020 she participated to the "Winter School: Four dimensions of future of work" funded by European Union's Horizon 2020 Research and Innovation Programme².

Meltem Ünal Deligny in her early years of the professional development she obtained an MS degree in marketing. After five years of experience in digital marketing and project management, she re-oriented her career in digital learning management. Her objective is to combine her digital skills with her humanistic approaches. Her research interests are mainly virtual reality, 3d objects, (Tam) technology acceptance model and gamification. She recently works in the Catholic University of Lille as an instructional designer. She has recently published with Fatma Güneri a research paper "A Word Visualisation Observation: The Hidden Meaning of The Words in Work Environments"³.

Soukeyna Faye, an active Independent lecturer in English, Intercultural Management and Organizational Behavior with an Executive International Management degree From Lille University and a Finance degree from Florida International University, eager to ongoingly contribute to students' learning and development while referring to academic reforms and up-to date teaching practices, knows the upper-level Education as well as the professional environment with their expectations as a former academic program Manager and a Citigroup Financial Analyst in her early career to share professional experience and research interests in students learning process, adaptability and reactivity in an International setting during virtual Business simulations games and diverse focus groups.

After more than 12 years preparing tailored engaging and blended pedagogy resources for hybrid courses, e-training adults and e-teaching college students during the unprecedented Covid 19 pandemic have driven her curiosity in new flexible learning management systems, with quantitative and analytical abilities, to happily participate in this paper as a future Instructional design thinker, having already developed good understanding of effective mechanisms of teaching and learning, with an appetite for innovative pedagogical design methods.

Introduction and Motivation Statement:

"I know the future is scary at times, sweetheart.

But there's just no escaping it".

Ernest Cline, *Armada* (Kupferman, 2020)

In recent years, Digital Technology has highly entered the learning scene, so that it has led to the evaluation of teaching practices. Many digital tools are already in use, whether in class or remotely, such as interactive whiteboards (TBI), MOOCs, EAH, etc. These tools are already part of the daily teaching practices of some learners and trainers.

But other innovations are emerging and will be continuously introduced and developed in the learning digital transition. This is the case with artificial intelligence (AI). According to "Larousse definition" AI is (Larousse, 2022): "*A set of theories and techniques used to produce machines capable of simulating human intelligence.*"

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² <https://www.inclusivegrowth.eu/files/Call-25/AI1.pdf>

³ <https://eujournal.org/index.php/esj/article/view/14852>

Robots, combined with artificial intelligence, can improve the quality of education by providing more personalized learning, objective and timely assessments, and identifying areas for improvement for graduation (Roboticsbiz, 2019). A robotics teacher works with students in a school environment by providing instruction and hands-on experience with robots (Resilient Educator, 2022). These machines ask questions, listen for answers, and read facial expressions as they interact with students (Lynch 2019; Newton & Newton, 2019).

Intelligent machines may eventually become a reality, but for now, interactive robots encourage students to participate in the learning process (Lynch, 2019). Regardless of the effectiveness of online learning platforms, there is still an inherent distrust of robots in society, especially in some sectors such as education (Gohd, 2017).

Motivation Statement: Due to the frequent absences of learners in the classrooms since 2020 and the obligations for the organizations of hybrid courses lecturers, researchers see for solutions to increase the quality of their teaching, interactions with learners under these circumstances and unprecedented events. Diverse questions regarding the Tech challenge, the decisions on solutions and implications have risen. For that reason, we believe that our motivation to hear the insights of students about the robot telepresence and share the notes with other researchers is coherent with the workshop.

Research objective and questions: The objective of this study is to identify students' insights about the telepresence of robots as a student and as a teacher. Concerning four research questions have been created:

- What are the advantages of robots telepresences as a teacher and an assistance of teacher?
- What are the disadvantages of robots telepresences as a teacher and an assistance of teacher?
- What are the advantages of robots telepresences to replace absent students?
- What are the disadvantages of robots telepresences to replace absent students?

Literature Review and Theories: In this study the focus will be on constructivist theories that learning and knowledge comes with experiences and active engagement (Kurt, 2021). AI and technology provide teaching/learning experiences via different interfaces and or platforms such as MOODLE, Coursera and tools (Zoom, robots etc.). The constructivist theories in a chronological order are listed as:

- A. The Constructivism (Piaget, 70s): Learning comes through action. The individual learns by adapting to an environment. It is by acting on the world that he learns (Giraut 2007; Masciotra 2007; Robinault 2009; Kenne 2009).
- B. The Socio-Constructivism (Vygotsky, 80s): In addition to adapting to a "milieu," socio-constructivism brings back the novelty of interacting with the "milieu". The individual learns best through interaction with others (Cherif 2020 ; Portex 2017).
- C. Socio-Cognitive Conflict (Doise and Mugny, 80s): When the learner becomes aware that his thinking is different from that of others and that these come into conflict with his knowledge (Buchs & Butera, 2004).
- D. Interactionist Constructivism and Scaffolding Theory (Bruner, 80s): It is an interaction between an adult and a child through which the adult tries to get the child to solve a problem that he cannot solve on his own (Hartmann, et al., 2015). The scaffolding processes allow the establishment of formats that are regulatory forms of exchanges. It is within these forms that the child, thanks to the support of the adult, will be able to become autonomous towards problem-solving behaviors (Spadafora & Downes, 2020).

Today traditional classrooms are converted in mobile, technology equipped learning spaces. By this way schools inspire for new teaching reforms, in other words smart, digital classrooms. In these classrooms there are various online tools and services available: Video conferencing, platforms, digital boards, IOT, robots etc.

Finally, those interactions between students and teachers happen, not only with a physical presence, but also with a telepresence. Telepresence systems provide immersive experiences with Avatars. In fact, Avatar images are reflected by HMDs which involve the implication of VR, AR and Robots. In the figure below usage of Avatars in a real space and virtual space illustrated:

VR (VRCHAT)

VR+AR (Mini-Me)

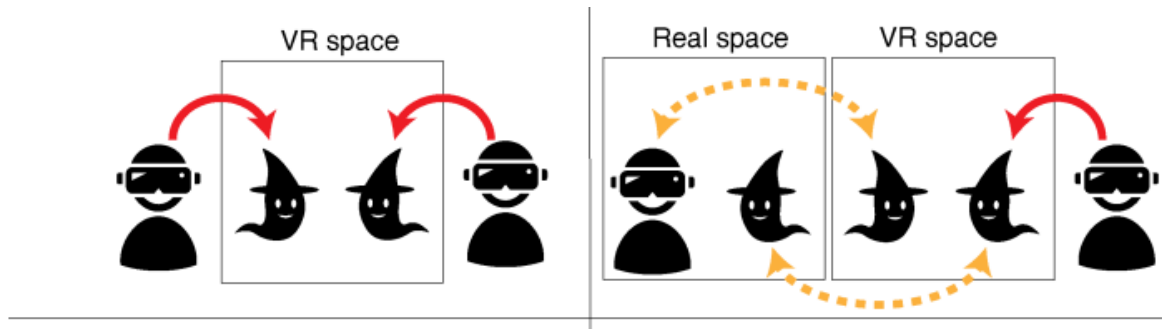


Figure 1: Avatars in VR and AR⁴

In the VRChat system communication between users occur in VR space. In the Mini-Me the VR users' gestures and movements in reality are mirrored on the behaviors of Avatar in virtual space. On the other hand, the AR users' can communicate to VR user in virtual space via the Avatar (Tsuchiya & Koizumi, 2016; Zhao, 2021; Devi, et al. 2021; Zhaoa, et al. 2021).

There are also different levels of benefits that students and teachers get in these classrooms. For example, concerning the telepresence of robots El Mimouni (2022) bring that question:

"What are the perceived benefits and drawbacks of robotic telepresence in the classroom with respect to both the controller of the telepresence robot and those in proximity to it (other students and instructors)?"

Because of the Covid-19, since 2020 the telepresence of robots to replace teachers and students has increased. So, the engagement of students and their learning experiences bring new questions into the mind of researchers. The previous studies couldn't fill the gaps due to the change of context and emerging issues in learning environments and tools.

Methodology: In this study in order to get students' insights about the robots telepresence in classes as a teacher and/or student, focus groups are created and the participants are provided with a watching activity as a stimulator for their discussion. The data has been analysed by a computer assisted technique, in other words by an online server, "called voyant-tools", which analyzed and illustrated the main themes through the transcribed answers of focus groups (Catterall & Maclaran, 1997).

The study has been realized with 31 Junior college students of International Management Programme from Lille Catholic University, in Marketing Strategy and Planning course. Ten focus groups of students have been set up for 2 hour-focus group practice. The repartition of students per group was: 9*3 and 1*2. Exceptionally, two groups of 3 turned out to be 4 because of two late students. Therefore they were only able to participate in the second part of the study. The order of the activity was as followed:

1. Watching videos (1 and 2)
2. Writing 30 minutes by answering the questions

First they are asked in video 1 "Meet Germany's first robot lecturer". After watching the video, students are introduced to the first task: "You're in class. The teacher is absent, but a robot is there to teach. Is this beneficial to your learning experience? If yes, what are the advantages and why? If not, what are the disadvantages and why? Write a 30-minute paper in your opinion."

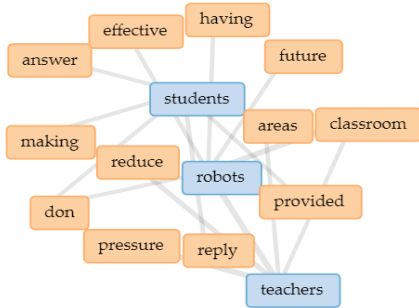
After 15-minute break, students groups watch the second video "Telepresence of robots for sick and rare disease children". Following the video, students also explore with the teacher new types of classroom robots which can be connected to Zoom or to other online communication channels. Finally, students are introduced to the second task: "If a robot replaces a student in the classroom (in general, besides the exceptional disease situations where student cannot actively participate to the class), would that be beneficial for the learning experience? Is so, how and why? If not, why not? Give reasons to support your argument. Write a 30-minute paper in your opinion."

Results: 2 groups (6 students) are "Yes" for robots to replace the teacher; 8 groups (23 students) are "No" to replace the teacher; 4 groups (12 students) are "Yes" for robots to replace the students; 6 groups (19 students) are "No" to replace

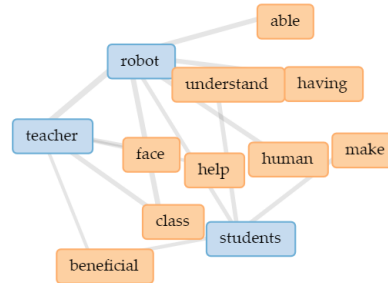
⁴ Original figure: https://www.researchgate.net/publication/349078686_Aerial_Imaging_by_Retro-Reflection_for_Mid-Air_Image_Display_and_Camera_Viewpoint_Transfer

the students. In a nutshell, the majority of groups are "No" to replace with robots. Via Voyant-tools⁵ students' main focus on each question is identified (Answers to the research questions: Annex, p. 4-11):

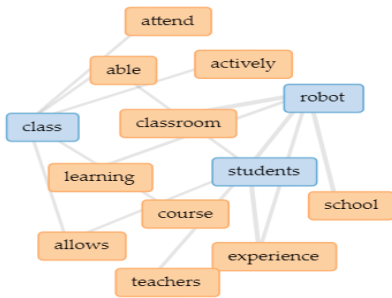
1. Yes For Robots To Replace Teachers



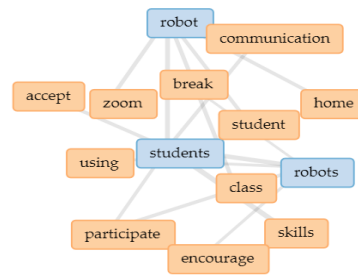
2. No For Robots To Replace Teachers



3. Yes For Robots To Replace Students



4. No For Robots To Replace Students



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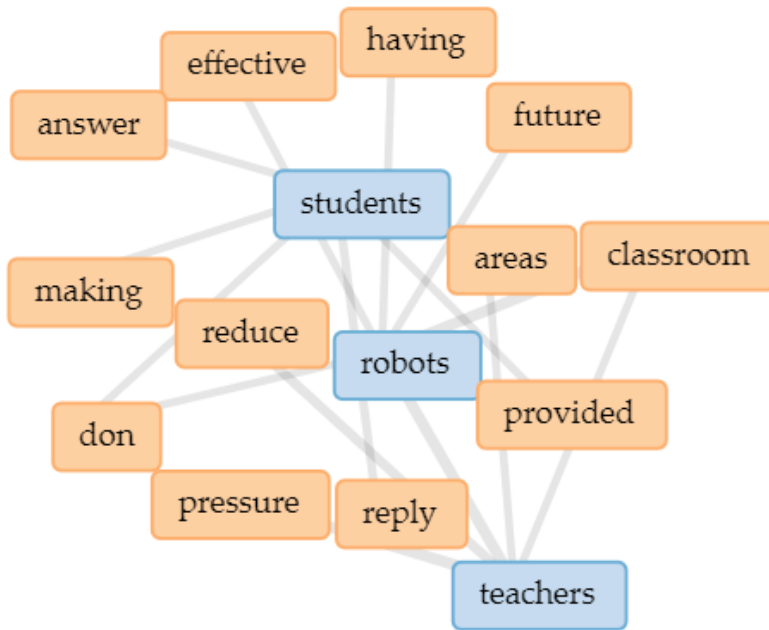
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ANNEX:

1. YES FOR ROBOTS TO REPLACE TEACHER:

2 groups (6 students) mentioned yes for robots to replace the teachers. Their main topics for this decision group the issues related to the teachers, robots, students:



Below some keywords (ex: pressure) have been found integrated into the similar topics. This is the reason why they haven't been separately categorized.

Teachers:

Reply: About the contents of the course, the robot has a lot of information and can do some research on the web to reply to the students. For the students, it is a pleasure to have all the information of the class, directly in their emails. The course is more concentrated and perhaps there is less time lost with distraction. The robot follows the structure of the class.

Reduce: Non-irrelevant conversations - using robots as teachers in the classroom can reduce irrelevant discussions in the classroom because robots cannot divert attention, be caught off guard, or be distracted from ongoing courses which means that the efficiency of the class can be improved.

Classroom: Having robots in the classroom and having students working with technology provided by university, students don't need to bring their own computers and notebooks which can be beneficial for their health as well as the environment. In a nutshell, this experience increases students environment concerns and consciousness.

Robots:

Future: This can be one of the main reasons why schools would be eager to replace human teachers with robots in the future since having robots can be very cost-effective.

In conclusion, the robot can be very benefic and beneficial for students. In general, there are more advantages than disadvantages. We then need to grow at the same time as the innovation for the future.

Making: Another big advantage is that robots can be connected to another technology so if quizzes are made for students, students can reply through tablets within the exact given time period to do so.

Don't: Robots are able to have a lot more patience dealing with students than a human teacher. Since human teachers can naturally be tired or feel irritated on certain days, and their emotions can affect the teaching process negatively even without them realizing it. Robots don't have the same issue since they don't have any emotions. That means that they always keep cool no matter what, which can make students feel more relaxed and help them focus on topics better.

Another advantage of having robot teachers is the fact that they don't need to get a monthly salary. This can be one of the main reasons why schools would be eager to replace human teachers with robots in the future since having robots can be very cost-effective.

Since robots don't have any emotions, students would know that there is no way they can persuade the robot to give them the quiz so they would just have to come prepared. Since they don't waste any time with small talks, they could do quizzes every class without slowing down the teaching process. So, having robots is also time-effective.

We believe that robots can actually motivate students to work harder and perform better since they can be programmed to create regular quizzes to start classes. Since robots don't have any emotions, students would know that there is no way they can persuade the robot not to give them the quiz so they would just have to come prepared. Also, since there is no waste of time with small talks, quizzes in every course could be organized without slowing down the teaching process.

Areas: What's more, Robot teachers can reduce the pressure on teachers in undeveloped areas. Robot teachers can solve the problem of the unbalanced distribution of educational resources, especially the unbalanced distribution of teacher resources. In big cities, educational resources are abundant. In rural areas, there is a large lack of high-quality (qualified) teachers. Robots can share the pressure of teachers. Robots can learn from the classroom of excellent teachers, or record the courses of excellent teachers in the form of recording and broadcasting for teaching.

Students:

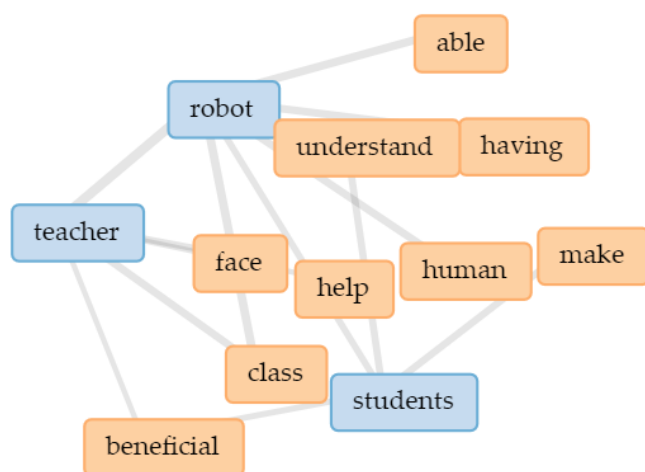
Answer: Robots have no limit in learning which means that they have broader knowledge than a teacher. So, they can answer many of students' questions.

Effective: Last but not least, having robots in the classroom and having students working with technology provided by university, students don't need to bring their own computers and notebooks which can be beneficial for their health as well as the environment

Having: Last but not least, having robots in the classroom and having students working with technology provided by university, students don't need to bring their own computers and notebooks which can be beneficial for their health as well as the environment

2. NO FOR ROBOTS TO REPLACE TEACHER

8 groups (23 students) they don't agree with the idea of robots to replace teachers:



Robot & Students:

Make: The robots cannot make sure if all the students prepare the course in a good manner.

And we've decided that if a teacher is absent, it would be a disadvantage for the students and make the learning process more difficult for them.

Therefore, we think that it is not beneficial for students, as students need to be disciplined a little bit and would probably make fun of the robots as it is new and they are not used to work with them or to be taught by them. It won't make a difference for students to read the same topic at home or have a voice read it in the classroom. It will negatively affect student productivity.

Able: At the end of the experience in Germany, they are not able to say if the robot is helpful in the long run. Upon watching the video about Yuki the Robot, we have come to the conclusion that a robot teaching a class would not be beneficial at this time. In the video, we see the robot perform many functions, with the help of the professor. It is clear that the robot would not be able to perform tasks fully on its own.

Additionally, a robot would not be able to answer questions the same way a professor could, as it would not have the life experience, education, and job experience that a professor has. Teachers are not just here to correct student work and give lectures, it's also about managing the behavior of the classes and the students.

A robot is not able to spontaneously answer a student's question if the answer to that question has not been recorded by the robot. Students may then feel frustrated that they cannot get the answer to their questions. And does a student want to go to class if he/she can't ask questions? The lack of spontaneity of a robot creates a pre-built lesson that could very well be replaced by an online video or a printed handout. The added value of a teacher is that a robot does not have its ability to adapt to different situations and students, compared to a teacher's adaptability competency.

Help: Also, it is important for students to create a relationship of confidence with their teacher. It helps them be more involved in courses and be more curious. Building a good relationship between students and professors with a robot sounds or looks impossible for the moment and this state of technology development seems to be far away.

It is possible that some problems can arise. If the robot suddenly stops, students can't do anything unless the robot is replaced with another robot or human teacher. In that case, students lose time, and if the robot is replaced by a human teacher, it means a robot is not perfect and always needs people's help.

In some cases, gestures and facial expressions of teachers can also be helpful in learning. In cases where the robot cannot provide the warmth of a human, the learning process may be adversely affected.

Understand: It cannot answer spontaneous questions: if it is freeing a professor up, it cannot explain if the students do not understand the question.

We believe that having a robot instead of a human teacher is reducing the ability of the students to learn. Indeed, students can't ask spontaneous questions to the robot because it is only able to answer them when someone put it in its system first. On top of that, the robot lacks a human approach and they may not feel comfortable talking to a machine that doesn't understand them (the machine doesn't have kids to feed or tooth pain).

Even if the robot can teach Maths, Science, Information Technology or computers, it is hard to teach poems and psychology, which means when teaching, students need to understand the whole meaning and relativity.

Second of all, we believe that technology cannot substitute human interaction: communication should be on a bilateral basis, a receiver and a sender that exchange meanings. We cannot be sure that the robot will receive the same meaning as the communicator, as it will just analyze sentences of keywords and mathematics. At the same time, we cannot also be sure that we will understand what the robot explains, and as it results from a series of instructions. We may find ourselves in a situation in which we ask for an explanation and we will receive the same answer over and over as this is the way it has been programmed.

It cannot provide critical feedback and answers. Robot lecturer cannot develop creative and innovative ideas and thinking to assist students understand some concepts.

As stated in the beginning, Yuki is an assistant. It can help the teacher in a class by managing a presentation (PowerPoint or canvas). Still, there are so many things that he cannot do that require programming, so leaving an AI robot such as Yuki to teach a class by himself will affect not only the students but also Yuki itself and both of their learning processes. Furthermore, students that have experienced a class with Yuki say that it is a bit harder, and some of them do not feel the difference between a robot and an online class (on YouTube, for example).

Human: Student probably won't be as concentrated and motivated during the course because they know that there's no human teacher, this might result in discipline problems.

The robot can't go to class by himself. A human has to help him.

In conclusion, today as never before, during the Covid-19, we realize how much the presence in the classroom and the relationship with the teacher are important for learning. A robot, not having the human side, cannot transmit passion to us that we think is very important. The passion and dedication of a professor for the subject can be a great lesson.

Secondly, as we see in the videos, the robot has a limited knowledge on the subject and it is programmed for specific tasks, while it cannot answer all of our questions. Yuki's functions such as doing monotonous tasks, advising students, oversees the class and practicing exam questions are not enough and cannot be compared to the human factor which is brought to us by a human teacher.

In conclusion, the human factor cannot be replaced by the technological one. Dehumanizing teaching just for the sake of modernizing education does not necessarily has a positive effect on students.

To sum up, we can say that having robots in class is dehumanizing teaching and giving less freedom to the professor. Also, as a student transitions throughout the education system from young to old, the relationships that one can have with a teacher can guide that student throughout their whole adult life. Having a robot in a human's place could take away valuable life lessons that have been learnt throughout a student's education.

In our opinion, given the state of development of the technology, the robot cannot teach by itself without being supervised by a human. Therefore, we think that it is not beneficial for students, as students need to be disciplined a little bit and would probably make fun of the robots as it is new and they are not used to work with them or to be taught by them.

In the end, it would be possible when the technology is sufficiently advanced, when the robot will be able to have real, efficient and quick interaction with students. But a transition period of several years would be necessary. The human teacher and the robot teacher would have to be together during this transitional period.

Teacher:

Class:

Furthermore, the robot does not have the same authority over the class as the teacher and cannot maintain the order and discipline in the classroom. Moreover, technological problems may occur and that can affect the quality of class and have a negative impact on the time for learning.

Still, there are so many things that a robot cannot do that require programming, so leaving an AI robot such as Yuki to teach a class by himself will affect not only the students but also Yuki itself and both of their learning processes.

It only asks questions that the professor prepares in advance. And the professor has to click on the right session in order for the robot to ask the right questions. There is no difference between online class and offline class. Indeed, the robot only asks questions or gives feedback on grades: these tasks are not taking so much for the professor to complete.

The video talks about everything Yuki can and cannot do. And the most related to this question is that Yuki has to be programmed before class by a teacher and cannot answer random questions. He entirely relies on the presence of the teacher.

Another thing is the attitude of the students towards the robot. When a professor conducts a class, students have some kind of respect towards the professor. They listen to him and try to get the most out of the material one shares. On the other hand, students view Yuki as a toy, and they don't feel the responsibility of listening to the professor or being fully attentive. Some students are even afraid that robots will leave them without jobs in the future, so they are not excited about taking classes with robots.

In addition to this, Yuki can't take care of problems during class, such as arguments, noise, etc. And one aspect that we need to consider is that robots like Yuki cannot move and need to be transported by a cart to go anywhere.

The robot needs to have very advanced technology and as of today the AI is not as efficient as a real teacher. In order to use a robot professor you need a high quality system in your class, plus everything mechanical can break. Hence, the robot, being mechanically designed, can break down at any time and cause a great disruption to learning. Only individuals with expertise can repair a malfunctioned robot. So in today's world, teaching robots will have flaws that are not acceptable.

The robot only has the ability to perform limited functions for students. If there was no teacher in the class, the robot would likely not be much help without the teacher, as it could not get itself into class on its own. The robot needed the help of someone else to transport it into a classroom. The robot is also limited on what it can do for students. The robot can scan a QR code from a student and provide grade scores and let the student know if all their work is completed or not. It likely would not know feedback about why they get a certain grade, what questions they get wrong, or what assignments a student has not yet completed. We see in the video that when the class got too loud, they have to take Yuki out of the room because it could no longer do what it needs to do because of the noise. If a robot is by itself in a room with students, it would have no way to control a classroom if it gets too loud.

Despite the immense technological advances of the last 10 years, it is clear that robots are not ready to replace humans, and are very far from it. They are certainly capable of performing monotonous and repetitive tasks, but they remain programmed objects. This means that they are only capable of dealing with the situations for which they are prepared

by humans. In the example of a classroom where a robot replaces a teacher, I don't think it offers the same quality of teaching to the students.

If the robot doesn't work it can be a waste of time, because the robot always needs someone to move him and fix him so someone should come with him to class to solve any possible problem.

Also, we believe that students may abuse this robot professor as they can cheat during the exams or just not pay attention to the explanations. In fact, no one will check how they work or if they follow the class.

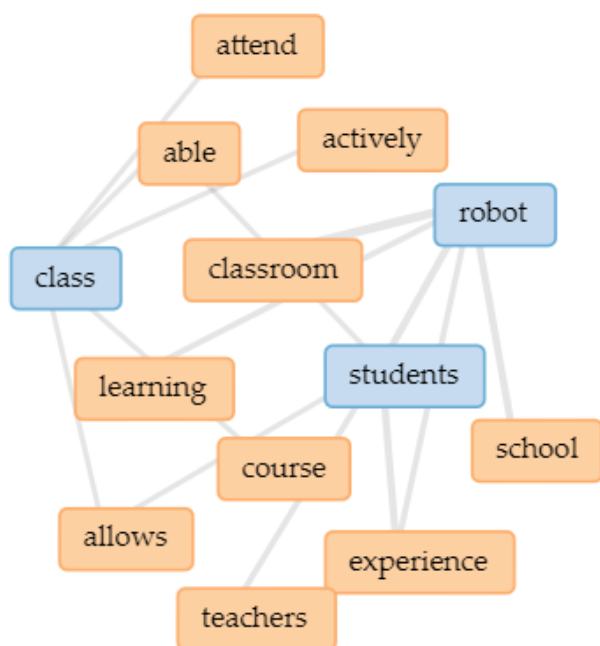
Face: Moreover, face-to-face interaction is one of the critical elements of education. When students communicate with professors and interact with them, they can learn more and also practice communication skills. With Yuki, it works differently. He cannot provide the full specter of knowledge the way professors do. As explained, he is not 100% a teacher; he is just there to help with teaching and facilitate the professor's job, at least for the moment.

Beneficial: We think that if a robot is introduced in this particular area, it will not be beneficial for the students AND for the professor. It will only keep from doing normal teaching.

In our opinion, having a robot teaching instead of a teacher is not beneficial. In fact, we can identify different disadvantages: first of all, I cannot rely that all the students present in class will pay attention and will be silent during the lesson (and the robot won't be able to work if the environment is too noisy, it will turn off).

3. YES FOR ROBOTS TO REPLACE STUDENTS

4 groups (12 students) have been for the decision for robots to replace the students.



Students:

Course: Thanks to its interactive functions, every ill child is able to follow live courses instead of catching them up later. After seeing this video on the example of the AV1 educational robot, we have decided that we are 100% sure that these kinds of robots would be beneficial for educational purposes.

It gives way for students who cannot make it to class to follow the course and interact simultaneously. It can be set in class, people around it can hear you, and you can listen to and see them. Robots such as AV1 work with 4G or Wi-Fi, making it easier to use even on educational trips. AV1 has 6 hours of a stream, which can be used during charging. It helps to be there without actually being physically there.

Classroom: If you had asked me the same question three years ago, I would have answered "but why do you want to replace students with robots? But this is not three years ago and Covid has come and gone. Today we need to reinvent human interaction. With the multiplication of teleworking practices and distance learning, we are sometimes no more than robots behind our screens. But then why shouldn't we really be robots? Imagine sitting in a classroom for a moment. But instead of having your absent classmate present behind his computer, he would be there through a robot that he would control entirely: movements, looks, interactions. This would allow him to follow the course better since he would be free to look wherever he wanted and therefore not depend solely on the teacher's webcam. He would be counted as a student who is really present and with whom we can interact, whom we can even touch if we want, and not just Mr. X behind his computer. Feeling more present would allow you to be more concentrated as if you were in class and less distracted by your environment, which is often the case when you work from home. And this is also true if you are not a student but a person who works with people at a distance (at home or abroad) who will do a meeting with colleagues behind a robot rather than with a colleague behind a computer. It's weird to say this but robots could humanize our relationships.

Teachers: Especially in these times of Covid, lots of children have to stay home because they are in contact with a positive person or positive themselves. Having a robot representing them in class can be really helpful for them and for the teacher.

Compared to Zoom or Teams, the robot is controlled by the child. The teacher only needs to put it in a way that the child can participate. The robot won't keep video records so other students and teachers do not need to worry about privacy issues.

Robot:

School: A benefit for a robot in school as well is so that for a number of hours per day the student won't have to think about their illness, they can interact with others without feeling completely different.

Schools that invest in a scheme like this can be seen as forward thinking as they have catered for all students.

Experience: Another thing is that the robot makes the learning experience of the student who is not able to attend the class and the experience of the students in the classroom much more interactive. The robot can move a little bit, it can blink, which shows that the student's got a question, the student can even talk using it. This way, people on both sides do not get bored, which positively impacts the learning experience.

Children that have to stay in and out of hospitals for long periods miss out on key life experiences that you make in school. A robot in their place will allow them to keep in constant contact with their friends and stay up to date with their learning.

We think it's beneficial for the learning experience of students that are ill for a considerable amount of time. The robot allows sick students to attend class in a virtual way.

To conclude, this robot is a good way to confront long-term health related obstacles.

Thanks to its interactive functions, every ill child is able to follow live courses instead of catching them up later.

Class:

Actively: Keep the child part of the group. The student can attend class actively and interact with the teacher. The children present in the classroom can carry the robot everywhere, during break or at lunch. Children at home can also ask some questions and discuss with classmates in real time.

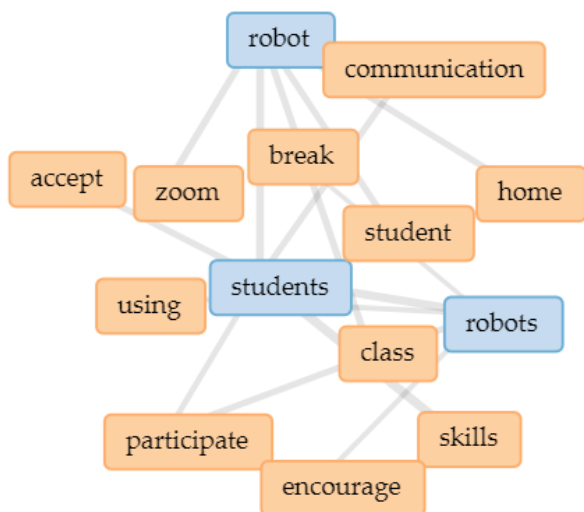
Attend: Also, the usage of the robot will improve the attendance rates. Students might feel lonely and bored at home, and many want to learn something from the class. AV1 makes the process of attending classes easier and more fun, so the students who are stuck at home will be more excited about participating in the class and learning

Able: The robot is able to show the classroom in all directions so that sick students can clearly know what is happening in the classroom.

Thanks to its interactive functions, every ill child is able to follow live courses instead of catching them up later.

4. NO FOR ROBOTS TO REPLACE THE STUDENTS

6 groups (19 students) have been for the decision of not having robots to replace the students:



Below some topics such as “communication”, “encourage”, Zoom have been found integrated to the similar topics:

Robots:

Classroom: It can also be very hard for teacher to notice robot blinking in case a child wants to ask some question. This can be difficult especially when there are multiple robots in the classroom and multiple kids wanting to ask questions at the same time.

Distance learning does not help develop oral skills and social interaction of students - although the robots can make the class participate in some degree. Most of courses require highly synchronous learning activities, requiring students to use some communication skills to participate. Replacing students with robots is not conducive to such interaction. Children may become reliant on using the robot and staying at home leading to; underdeveloped social skills, obesity, poor mental health. Students, especially young, require stimulation in the classroom to improve their ability to concentrate and learn. When at home and using the robot, it would be easy to be distracted and not focus on the teacher or the task they have been set.

Whilst Zoom requires teachers to connect online too, robots would still require a teacher to move it about from classroom to classroom whilst also ensuring they're charged.

The era of pandemic has made a great change within the educational sector. Several schools and universities have switched to online classes and conducted their lessons in that manner. Such experience has shown itself as helpful and useful without using robots. Following this idea, we would not encourage using physical robots in classrooms to substitute students as their avatars.

Lastly, the peer experience that is shown in the video is relevant only for specific cases, but not the general situation – when a student is absent for a shorter period of time (maybe they are sick or just cannot physically attend the class) it is not necessary for them to socialize because they will be back in the classroom very soon. Thus, this kind of expense for schools and faculties is not necessary.

Class: In the video we can see that the target group for the product are chronically sick or disabled children who cannot attend classes in general. In this sense, if all the other children attend classes and this particular child cannot, we would support the idea. But this is only a specific situation, and as we have mentioned, in the general case of transforming education in this way, we do not support it.

Firstly, student’s absence from class is usually happening in short period of time and can be compensated in different ways which are more effective, efficient and cheaper. For example, you can watch the livestream the class via Zoom or Google Meet which is much cheaper and teachers and students are already used to these platforms.

Secondly, the majority of times the classes are recorded, which is not the case for a robot and students can easily rewatch and take as much time as they need to understand the matter.

Break: Another problem can be definitely technological difficulties which can be solved only by professionals. In case multiple robots break down at the same time, the whole learning process needs to be stopped. Therefore teachers can have problem explaining everything on time.

Teacher: Expensive compared to alternatives - £2200 for 6 hours of battery life with potential to run out after 2/3 lessons is extremely expensive so there may not be enough to share round every student creating potential issues for teachers when allocating them. Alternatives (eg. Zoom) rely on teacher connecting too but can benefit from sharing the screen, sending work/links through the chat section. Unlike the robot.

Zoom is also far cheaper and is a software, so less likely to break and wouldn't cost to repair or replace unlike the robot.

Accept: Teacher's Reluctance To Accept robot students - Some old teachers get used to the traditional education mode, they prefer to complete their class through the traditional mode of education. Maybe they will be reluctant to accept robot students. Similarly, parents and class members may not be content with their class being watched by a robot when the stream has the potential to be intercepted by anyone.