



**UNIVERSITY
OF TURKU**

**Elias Robot's Effects on Students' Willingness to
Communicate in a Second Language from the
Teacher Perspective: A Qualitative Study**

Juulia Kantola

Master's Thesis

Degree Programme in Language Learning and Teaching, Department of English

School of Languages and Translation Studies

Faculty of Humanities

University of Turku

November 2023

Master's Thesis

Degree Programme in Language Learning and Teaching,

Department of English:

Juulia Kantola

“Elias Robots Effects on Students’ Willingness to Communicate in a Second Language: A Qualitative Study from Teacher Perspective

Number of pages: 43 pages, appendices

Elias robot is a language learning application by Utelias Technologies Ltd that combines artificial intelligence, robotics, and speech recognition. Although called a robot, Elias robot is an application, not a robot. The application can be used through a social robot, Nao V5, Nao6, or Pepper robot, or from an electronic device, such as a phone or tablet. This study examines the possible effects of Elias robot on language learners' willingness to communicate from their teachers' perspective, as well as the assumed reasons behind the possible effects. In addition, this study aims to assess the potential of Elias robot to increase students' L2 willingness in English from the teachers' point of view. The data for the study were collected from five teachers with a semi-structured interview. The teachers have different educational backgrounds, they teach or different levels in Finland using different languages and have used Elias robot in their teaching. In the analysis of the qualitative data, a data-driven content analysis was utilized.

Based on the analysis of the interviews, the teachers felt confident that Elias robot had had a positive impact on their students' L2 willingness to communicate. Three themes were found as the assumed reasons behind the positive effect. The themes are increased motivation, emotional safety, and approachability. Regarding the third research question, the teachers thought Elias robot would succeed or has succeeded in raising students' L2 willingness to communicate in English from their perspective. The study fills a gap by combining robot-assisted language learning and willingness to communicate. In the future, the same topic could be further studied from the learners' point of view.

Key words: willingness to communicate, robot-assisted language learning, L2 learning, spoken language

Table of contents

1	Introduction	5
2	Social robots and robot-assisted language learning	7
2.1	Social robots in learning environments	7
2.2	Elias robot	10
3	L2 willingness to communicate	13
3.1	Individual differences in SLA	13
3.2	Willingness to communicate	14
4	Data collection and analysis	19
4.1	Teachers assessing student L2 WTC	19
4.2	The interview	21
4.3	The analysis	22
5	Results and discussion	25
5.1	Has Elias robot increased the students' willingness to communicate in the target language from their teachers' point of view?	25
5.2	Why does Elias robot increase learners' willingness to communicate from teacher perspective?	27
5.2.1	Increased motivation	28
5.2.2	Emotional safety	30
5.2.3	Approachability	33
5.3	Could Elias robot increase the students' L2 willingness to communicate in English based on the teachers' opinions?	35
6	Conclusion	38
	References	40
	Appendices	45
	Appendix 1 The composition and basic questions of the interview	45
	Appendix 2 Finnish summary	46

Tables and Figures

Figure 1: Humanoid- robots Nao V5, Nao6, and Pepper, through which Elias robot application 10

can be used (Uteliias Technologies Ltd., 2023)

Figure 2. The Heuristic Model of Variables Influencing WTC (MacIntyre et al., 1998). 15

Table 1. Basic information of the interviewed teachers that is relevant for this study. 20

Figure 3. The composition of the interview. 22

Abbreviations

L2 = second language

TALL = technology-assisted language learning

RALL = robot-assisted language learning

WTC = willingness to communicate

HRI = human-robot interaction

AI = artificial intelligence

SLA = second language acquisition

ID's = Individual differences

1 Introduction

During the last decade, utilizing technology and robotics in learning environments has gained interest and opened possibilities to renew didactics. Within this context, the emergence of social robots, characterized by their capacity to function autonomously and engage in meaningful communication while adhering to established social norms (Bartneck and Forlizzi, 2004, 592), has raised the interests of many educators, learners, and researchers. Ao and Ju (2022) write that robot-assisted language learning (RALL) can be interpreted as any learning situation where a robot functions as some aid to help students learn the language. Elias robot is a language learning robot application created by Finnish Utelias Technologies Ltd. It can be used as a social robot with a NAO or Pepper robot or by itself from an electronic device. The technology behind Elias robot combines *artificial intelligence (AI)*, *robotics*, and *speech recognition* (Utelias Technologies Ltd.). Founded in 2017, the application focuses on practicing speaking skills and is currently the only robot-based app specially designed for learning spoken language (ibid.). Alimisis and Kygnigos (2009, 17) divide robotics into two categories based on their role in learning. Robotics can be a *learning object* or a *learning tool*. When robotics is a learning object, the students learn about robotics, whereas in robotics as a learning tool, the students learn about other subjects with the help of robotics. Elias robot aligns with the latter definition: it is a learning tool for learning languages. It contains ready-made language courses in eight target languages: English, Spanish, French, Italian, German, Chinese, Finnish, and Swedish. However, teachers can edit these lessons or create their own study units independently or with the help of ChatGPT.

MacIntyre (2007, 564) defines *willingness to communicate (WTC)* “as the probability of speaking when free to do so”. In a second language (L2) WTC, *L2 proficiency* and *communicative competence* are more significant factors than personality (Dörnyei 2003, 12). Contrary to the presumption that good language proficiency and communicative competence always foster WTC, Baker and MacIntyre (2003, 71) emphasize the critical role played by the learner's perception of their proficiency in the L2. Being a proficient target language speaker does not always mean the language learner is willing to communicate in the language. This offers an explanation as to why some learners may refrain from utilizing the language due to a misalignment between their perceived and actual language proficiency levels. Alemi, Meghdari, and Gazisaedy (2015) followed the learning outcomes of Iranian teenagers when studying English as a foreign language (EFL) with a teacher accompanied by a humanoid

robot, in contrast to just having the teacher. In comparison to traditional instruction without robotic assistance, the RALL-group students reported a heightened perception of more effective learning, contributing positively to their long-term language learning motivation. Their findings are supported by Chang et al. (2010), who studied Taiwanese EFL students who used robotics in their learning. Alemi, Meghdari, and Gazisaedy (2015) add that feeling motivated decreases L2 speaking anxiety, which, based on a study by Shanti-Manipushpika (2018), has a strong positive correlation with increasing L2 WTC.

The primary purpose of this thesis is to study the potential influence of Elias robot on language learners' second language (L2) willingness to communicate (WTC) from the perspective of their teachers and the assumed reasons behind the possible effects.

Additionally, this study aims to assess the potential of Elias robot to increase students' L2 willingness to communicate in English, as perceived by teachers. Although RALL and L2 WTC have been studied, an apparent research gap is evident, as only one previous study integrating both themes was found. Hsieh, Yeh, and Chen's (2023) study focused on the effects of multiple tangible objects that also included, for example, phones and tablets, in addition to a language-learning robot. In their study, the robot's effects and the impacts of the other tangible objects were not separated. Furthermore, the research was made from a student perspective, indicating a gap for a study from a teacher perspective that precisely focuses on the effects of a language learning robot on student L2 WTC. Elias robot has already been studied from a few viewpoints, including its customization for different learners (Kouri et al. 2020), child-robot relationship (Peura and Johansson 2023), and advice-giving between young learners during RALL (Honkalammi, Veivo, and Johansson 2022). Many studies regarding Elias robot or RALL have been done from the student perspective. Since teachers are professionals in assessing, and their work requires constant assessment of both their students and the chosen learning material, teachers were chosen as the viewpoint of this thesis.

Therefore, my research questions are as follows:

1. Has Elias robot increased the students' willingness to communicate in the target language from their teachers' point of view?
2. Why does Elias increase learners' L2 willingness to communicate from the teacher perspective?
3. Could Elias robot increase the students' L2 willingness to communicate in English based on the teachers' opinions?

2 Social robots and robot-assisted language learning

In this chapter, the concept of *social robots* is introduced, together with previous research from the field. *Humanoid robots*, *artificial intelligence*, *technology- and robot-assisted language learning*, and *human-robot interaction* are also briefly explained. As the exact language learning robot studied is Elias robot, it is essential to include an explanation of the basic principles of its use and earlier studies.

2.1 Social robots in learning environments

A social robot is a type of robot that can operate independently or with some degree of autonomy and is designed to engage and communicate with humans while adhering to the expected social behaviors of the individuals it interacts with (Bartneck and Forlizzi 2004, 592; Cerrato and Campbell 2017). They are physical entities and can be touched, differentiating them, for instance, from pictures of robots that appear on screens, write Ao and Ju (2022). Tung (2016) writes that *humanoid robots* are more familiar types of robots for learners with their recognizable features and characteristics since they have been formed to resemble a human. According to Cerrato and Campbell's (2017) research, a strong social connection between a human and a social robot requires the robot's linguistic, verbal, and visual features to work in a synchronized manner. To function as described, social robots require artificial intelligence (AI). AI is defined in various ways by multiple researchers. Coppin (2004, 4) explains AI to be a set of abilities by machines typically evident in human beings. Adapting to new situations and dealing with those, problem-solving, answering questions, and devising plans are examples of the many functions machines powered by AI can do. In another definition, Whitby (2009, 11) writes that AI is the study of human, animal, and machine intelligence that aims to artificially create similar behavior that can then be applied to computers. Hence, AI is both a set of human-like abilities in machines but also the study of natural intelligence that can be artificially created for something that would not automatically have that intelligence, such as a robot.

Alimisis and Kygnigos (2009, 17) divide robotics into two categories based on their role in the learning process. Robotics can either be a *learning object* or a *learning tool*. The difference between the two types is that in robotics as a learning object, the students learn about robotics. In contrast, in robotics as a learning tool, the students learn about other subjects with the help of robotics. When discussing language learning with a robot as a

learning tool, the type of learning is called *robot-assisted language learning* (RALL), which is a branch of *technology-assisted language learning* (TALL) (Ao and Ju 2022). RALL is defined as utilizing a robot or robots in language lessons to help students learn the language (ibid.). One of the goals of RALL is to improve social robots and human-robot interaction (HRI) to support language learning (ibid.). Belpaeme et al. (2013, 452) write that both children and adults “typically do not see a robot as a mechatronic device running a computer program, but attribute characteristics to the robot which are typically expected to be attributed to living systems.” However, these thoughts are more common among children than adults (ibid.). This suggests that, in general, people do not perceive a robot simply as a machine with components controlled by a computer program but personify the robot by thinking it could have emotions or intentions. Breazel (2003, 168) argues that people generally apply a social model similar to human-human interaction while discussing or observing the actions of a social robot. From a linguistic perspective, despite various definitions of social robots emphasizing “human style communication,” most studies do not incorporate how social models could be applied to HRI in addition to human-human interaction.

Robotics should not be an independent value in educational situations but a tool that brings some benefit to language learning. Therefore, it is crucial to conduct research on the impacts of implementing social robots on various aspects of language learning. Based on previous studies on learners of various ages, having a social robot in a language classroom has positive effects on the learning outcomes: learners remember words faster (Leeuwestein et al. 2020), their grammar use becomes more precise (Khalifa, Kato & Yamamoto 2019), and oral communication in general developed to be more fluent (Iio et al. 2019). On the other hand, Chang et al. (2010) studied whether there was a difference in the learning outcomes of Taiwanese L2 learners of English when they were learning English vocabulary from a social robot in contrast to a robot that appeared on a computer screen. The learning outcomes were somewhat similar for both groups. A Japanese group of ESL learners from grades one to six studied English together with a robot for two weeks, and the groups’ listening comprehension skills improved significantly (Kanda et al. 2004). Hong et al. (2016) got similar results in their recent study, where they concentrated on Taiwanese ESL students in fifth grade. However, during an eight-week study on young Korean L2 students, their listening comprehension skills were even worse than before the learning period with a social robot (Lee et al. 2011). When it comes to speaking, Chang and Chen (2010) studied using *humanoid robots* in an elementary foreign language classroom to practice dialogues. Their findings

indicate that whereas a peer or a teacher might not always be a very willing dialogue partner, the robot does not get tired of repeating the same things the students find challenging and need more time practicing since it is a machine. Making mistakes is an essential part of language learning, which, despite being important in the process, may embarrass learners and make them feel uncomfortable speaking in front of other people. However, based on studies (Chang & Chen 2010; Wang, Young & Jang 2010), making mistakes in front of a robot is considered far less embarrassing, which causes the students to speak more and form more unique sentences when compared to a dialogue between a student and a peer or a student and a teacher. Furthermore, these positive language learning experiences increased the effectiveness of the students' learning. According to Hein and Nathan-Roberts (2018), the most common elements of languages that robots have been used to teach are vocabulary and oral skills. They write that RALL of vocabulary learning and spoken language have been studied more than using RALL to improve other subskills of language competence. As for learning to read, a group of young children from South Korea were taught to read with the help of a robot, while another group was learning from a video (Hyun et al., 2008). There was no difference between the groups regarding the success of learning.

The results of robot-assisted language learning form a somewhat contradictory overall picture, and there is still much to be explored. The topic of this study, willingness to communicate and robotics, for example, have been studied very little. The same observation has been made by Hsieh, Yeh, and Chen (2023), who call the study perspective understudied in their recent research article. In addition to WTC, they studied how social robots, phones, and tablets can help young L2 English learners' pronunciation. The data concerning WTC were collected through a survey. Based on the answers, students' WTC improved after interacting with the tangible object (robot, phone, and tablet), as well as their pronunciation. Unlike this study, the focus was not only on the social robot, and the impacts of social robots cannot be separated from the other tangible objects.

Although social robots benefit students' learning, no study indicates that using just a robot as a teacher would be better than having an actual human teacher (Tuna & Tuna 2019). One reason for this is that the robots used in RALL often cannot recognize faces and react to student's facial expressions that reveal different kinds of emotions (ibid.). Therefore, educators should not be worried about a robot making them redundant but instead, see the additional opportunities a robot could bring to their pedagogy. However, technology and robotics are constantly developing to better fit the current and future world's needs. In RALL,

as the term indicates, the robot assists the teacher, and the purpose is not to develop RALL towards the robot being the only teacher.

2.2 Elias robot

Elias robot is a language learning application by Utelias Technologies Ltd that combines artificial intelligence (AI), robotics, and speech recognition (Utelias Technologies Ltd, 2023). Thus, although called a robot, Elias robot is an application, not a robot. However, the application can be used through a social robot, Nao V5, Nao6, or Pepper robot, or from an electronic device, such as a phone or tablet. Practically speaking, Nao V5, Nao6, or Pepper could be understood as the hardware of Elias robot, whereas the Elias robot application functions as its software. For the sake of this thesis, the effects of using Elias robot application are studied when used via some of the three robot types mentioned. As stated above, one characteristic of a social robot is that it must physically exist in space. Nao V5, Nao6, and Pepper are all humanoid robots, which means they have been created to resemble a human-like character, as illustrated in Figure 1 below.



Figure 1. Humanoid- robots Nao V5, Nao6, and Pepper, through which Elias robot application can be used (Utelias Technologies Ltd., 2023)

The two Nao robots on the left side of Figure 1 are significantly smaller than Pepper robot on the right and also the most used ones together with Elias robot application. Whereas Nao V5 and Nao6 are 58 centimeters tall (Aldebaran, 2023) and weigh around 5.5 kilograms, Pepper

is 121 centimeters tall and weighs 29 kilograms (SoftBank, 2023). Figure 1 illustrates the size difference between the types of robots well, although the laptop appearing behind the robots is not true to size, which could make it hard to compare the robots' sizes to real-life objects and humans. Their given dimensions, however, tell that they are not as tiny as the picture lets us assume.

The Elias robot application focuses on practicing speaking skills despite being used with a robot or from another device. Founded in 2017, Elias is a relatively new addition to the field and keeps developing. Like any innovation, the effects of its use require research of different aspects and from various viewpoints. In the case of Elias robot, it is a learning tool that is used for learning languages. Elias robot can be used in three different manners: the teacher can choose a ready-made lesson the company has provided or another educator has created, make their own lessons from scratch, or combine these two by editing a done lesson to fit the students' educational needs better. It has warm-up exercises, repeating and memorizing tasks, and supported conversation exercises. It also offers the opportunity to facilitate discussions between the learner and Elias. Therefore, although Elias robot was primarily created to be a language-learning robot, it can, in practice, be used to learn many other skills. Learning, in general, is typically divided into formal, non-formal, and informal learning. Werquin (2010, 21-23) explains the differences between these three types of learning: Formal learning happens in an organized environment, such as school, and learning is the intention of the activity. Non-formal learning is intentional from the learners' point of view, as is formal learning. However, the situations where learning occurs are not explicitly designated as learning. Informal learning results from daily activities, where learning is not the goal of the action but rather a byproduct of another activity. This kind of learning is also unintentional from the learner's perspective. Although, in most cases, language learning robots are used in classrooms, and learning is the goal of the action from the educator's point of view, the learners can interpret the situation simply as communicating with a robot. Regarding Elias robot, it is marketed that "Elias Robot can dance, sing and play various games. The students learn a language while having fun" (Uteli Technologies Ltd., 2023). Learning a language while having fun indicates that learning with Elias is, at least to some parts, informal, except that it is used in a school environment. On the other hand, repeating after Elias robot's model and memorizing words are the kind of tasks that could be interpreted as parts of formal learning since the student is most likely aware that they are learning new words and pronunciation with Elias.

Even though Elias robot is not by no means designed to supplant a human teacher, it does bring elements to the lessons a teacher alone could not perhaps bring. During Ahtiainen and Kaipainen's (2020) four-month field study, two leading roles of Elias were recognized after analyzing the interaction between the robot and young language learners: Elias robot was both an *encourager* and a *learning companion*. The teachers of the students reported that Elias encouraged even the quietest students in the classroom to speak when working with the robot. In addition, despite the robot's small size and being viewed more as a peer rather than a teacher, the students obeyed Elias, and the robot had authority. Elias motivated the students to learn as a learning companion because learning with a robot felt exciting and contained various teaching methods.

As mentioned, Elias robot is a relatively new addition to RALL, and perhaps, therefore, there has been relatively little research done about it in addition to the study mentioned above. Honkalammi (2022) interviewed two teachers who had used Elias in foreign language classrooms while teaching children. The main themes found from the teachers' statements were that Elias inspires students to learn and encourages them to speak. They also brought up technical difficulties regarding the robot's speech recognition. In addition, in the following studies, Elias has been studied from a student perspective: the customization of Elias for different learners (Kouri et al. 2020), advice-giving between young learners during RALL (Honkalammi, Veivo and Johansson 2022), and child-robot relationship (Peura and Johansson 2023). Peura and Johansson's (2023) study about the development of the social bond between Elias robot and groups of L2 French students in 3rd and 5th grade disguised under a language learning task revealed Elias had a hybrid role. It was not viewed merely as a machine or a human but a machine with a personality, and the students created an imaginary world around the Elias robot they called with the name Domi. Research regarding Elias robot has been mostly done from the student perspective. When it comes to technology, there has been research done about Elias robot's design and programming. Since this thesis focuses on the robot's pedagogical aspects that impact second language learning, those studies will not be introduced. Moreover, there are several studies about RALL where the type of humanoid robot is mentioned but not the application used. Therefore, there may have been a study where Elias robot has been used, but it is not included here as it is unclear whether the robot application in question has been Elias or some other. The discussion will now move on to explaining willingness to communicate (WTC).

3 L2 willingness to communicate

In this chapter, the second central concept of this study, willingness to communicate (WTC) in second language learning, will be explained in detail. Before that, it is essential to discuss individual differences in SLA to understand what makes all language learners unique and, hence, their WTC different.

3.1 Individual differences in SLA

Second language learning (SLL) is a complex phenomenon; thus, no language learner is the same regarding their learning qualities. SLA is commonly used as an umbrella term for language acquisition and learning (Pietilä and Lintunen 2014, 12). The difference between second language acquisition and second language learning is that acquisition is the type of learning that happens when all humans absorb their first language: a result of social interaction with a target language speaker, which results in picking up the language without being advised or knowing why certain things are correct or incorrect in the language (Pietilä and Lintunen 2014, 13). Language learning, on the other hand, is a conscious action that includes explicit learning.

The term second language acquisition also consists of the ambiguous concept of a *second language*. Pietilä and Lintunen (2014, 14) write that a second language (L2) does not necessarily indicate chronologically the second language the individual learns, but learning a language in a society where it is used in everyday situations and has an official status. In the Finnish context, learning Swedish would be considered SLA, as it is the other official language in Finland besides Finnish. The problem with this assumption is that despite the status, there are very few L1 Swedish speakers in some parts of the country, and hence, the language cannot be heard in that society. On the other hand, the English language does not have an official status in Finland and many other countries where it is used widely. This thesis does not focus on learning some specific language using Elias robot; therefore, all languages learned with Elias are referred to as an L2 in this thesis, whether English, Finnish, or French.

Learning an L2 can be relatively effortless for one and very challenging for another. Although the learning process is the same for all, the learning outcomes and the speed of learning are where the differences become visible (Pietilä 2014, 45). These discrepancies that together

make unique language learners are called *individual differences* (IDs). IDs include *language aptitude, motivation, personality, age, learning strategies, and learning style*. Next, I will move on to explaining WTC and the correlation between it and the recently mentioned IDs.

3.2 Willingness to communicate

MacIntyre (2007, 564) defines WTC “as the probability of speaking when free to do so.”

Generally, personality is considered the most important factor in who wants to talk and who does not. However, in L2 WTC, one’s L2 *proficiency* and *communicative competence* are more significant factors than personality (Dörnyei 2003, 12). Baker and MacIntyre (2003, 71) add that good language proficiency and communicative competence do not automatically lead to WTC. In addition, a central variable is how the student perceives their skills in the target language (*ibid.*) since being a proficient target language speaker does not always mean the language learner is willing to communicate in the language. This offers an explanation as to why there are individuals in L2 classrooms with exceptional language skills in terms of their knowledge and communicational abilities who do not want to use the language since their self-perceived language skills are not equivalent to their actual level. Alemi, Meghdari, and Gazisaedy (2015) followed the learning outcomes of Iranian teenagers when studying English as a foreign language (EFL) with a teacher accompanied by a humanoid robot (RALL) in contrast to just having the teacher. The students in the RALL group reported experiencing feeling they had learned more effectively, which was helpful to boost their motivation in the long run. Their findings are supported by Chang et al. (2010), who studied Taiwanese EFL students who used robotics in their learning.

WTC does not remain the same over time and in different interaction situations. MacIntyre et al. (1998) created a Heuristic Model of Variables Influencing WTC to portray the range of possible influences of which L2 WTC consists of and to describe their relation to one another in a pyramid model. The Heuristic pyramid model can be seen in Figure 1. Zarrinabadi (2019, 20), like many other L2 WTC researchers, applied the same model in their research with the following reasoning: “MacIntyre et al.’s (1998) model is one of the most all-inclusive and widely studied theoretical frameworks on the factors influencing L2 WTC. Their model explained the interrelations among diverse psychological, linguistic, and communication-related elements that could influence L2 WTC.” Although the model is widely used and praised, it was formed in 1998, and many things regarding communication have changed since then. Nowadays, verbal interaction in an L2 is happening ever-increasingly through

electronic devices, such as phones and videogame devices. It could be beneficial to study whether the model can be applied to communication situations that do not happen face-to-face or, in my case, between a human and a robot. As previously stated, HRI resembles human-human interaction to a great degree regarding how the person views the social robot as an interlocutor. I chose to use the model to explain both L2 WTC and the findings of this thesis because it provides an all-encompassing theoretical framework regarding variables that together explain L2 WTC.

Heuristic Model of Variables Influencing WTC

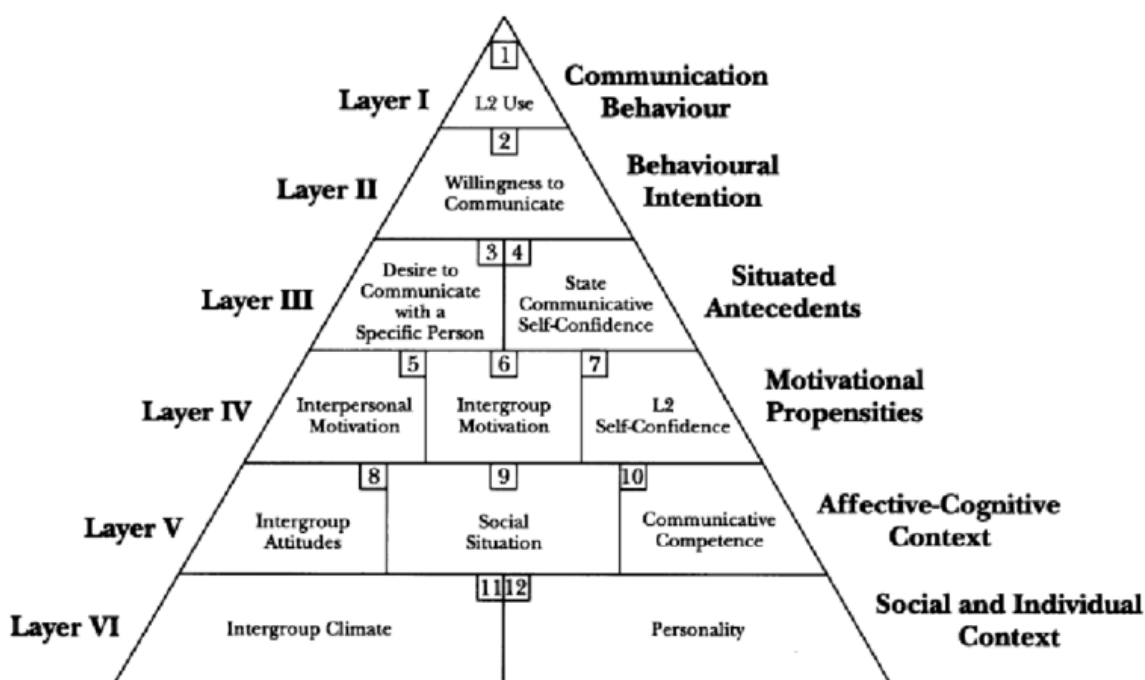


Figure 2. The Heuristic Model of Variables Influencing WTC (MacIntyre et al., 1998).

The shape of the model was chosen to be a pyramid since some layers and boxes impact others more than the rest. What is meant by this is, for example, when looking at Layer III and its subsection, called a *box* here, *Desire to Communicate with a Specific Person*, it is located on top of Layer IV subsections *Interpersonal Motivation* and *Intergroup Motivation* meaning especially those parts of the Layer IV have an impact on the box of Layer III. A similar formulation can also be seen on other layers of the pyramid. Simply, the lower parts of the pyramid function as a base for all the layers above, resulting in Layer I, *L2 Use* (MacIntyre et al. 1998, 546).

The pyramid can be divided into two sections: the bottom three layers portray the enduring influences on one's WTC, whereas the top three layers represent situation-specific influences on L2 WTC. MacIntyre et al. (1998, 546-547) call these two variables *enduring influences* and *situational influences*. The first consists of, for instance, personality, communicative competence, and relationships between different groups. These qualities often remain stable and do not vary from time and situation. Situational influences include one's knowledge of a specific topic of discussion and willingness to communicate with a particular interlocutor, to name a few. These elements can change significantly depending on the characteristics of the social interaction. In addition to the enduring and situational influences, the model can be interpreted as six layers from bottom to top called *Social and Individual Context*, *Affective-Cognitive Context*, *Motivational Propensities*, *Situated Antecedents*, *Behavioural Intention*, and *Communication Behaviour*. These layers are further divided into boxes that were already mentioned when explaining why a pyramid was chosen as the model's shape. Each of the six layers has one to three boxes or, in other words, subsections. Next, the *enduring influences* (Layers VI, V, and IV) with their boxes will be discussed, as well as the *situational influences*. The model is explained in this order since L2 WTC is built from the lowest parts of the pyramid up to L2 production.

Starting from the bottom of the model, *enduring influences* of L2 WTC. Layer VI, *Communicational Behaviour*, consists of two boxes: *Intergroup Climate* and *Personality*. MacIntyre et al. (1998, 555) write that communication is simply interaction that is a formulation of the society and the person. *Intergroup Climate* represents the society, whereas *Personality* describes the stable character of the individual. Typically, a human's personality remains the same from situation to situation despite having multiple roles. Some personality patterns seem to find it easier to learn languages or communicate with other people than the rest (MacIntyre et al. 1998, 557). Having this or any other kind of personality affects other factors that ultimately lead to WTC. Languages and cultures have a strong relation to one another. Hence, different language groups might not be viewed as equal. Like on personality, an individual does not have much of an impact on *Intergroup Climate* either.

Although the next Layer, *Affective-Cognitive Context*, has a similar box, *Intergroup Attitudes*, it differs from the previous *Intergroup Climate*. Anybody learning an L2 must have an L1, and hence, their viewpoint on the L2 usually comes outside the society where the L2 is spoken. The relation between the L1 and L2 communities plays a significant role in whether the L2 learner wants to use the language for communicating, to begin with. Another critical

factor is the box *Communicative Competence*, as the individual's degree of L2 proficiency has a great impact on WTC (1998, 554). The participants, setting, purpose, topic, and channel of communication together form the *social situation* (MacIntyre et al. 1998, 553). However, these could be a part of situational influences since the social situation is formed by many different factors that change from one setting to another.

The layer closest to the *situational influences* is Layer IV, *Motivational Propensities*, which has three boxes: *Interpersonal motivation*, *Intergroup Motivation*, and *L2 Self-Confidence*. According to MacIntyre et al. (1998, 550), these are usually steady individual differences that can be applied to most situations. These factors together lead to self-confidence and the need to communicate with people in the target language society. Whereas *Interpersonal Motivation* refers to the motivation of one interlocutor to communicate with another, *Intergroup Motivation* is the interlocutor's longing to be a part of that language group. *L2 self-confidence* compiles the individual actual communicative competence but also how the person perceives their skills, which might not be in line with their actual competence level. As the stable, *enduring influences* of the Heuristic Model of Variables Influencing WTC have been explained, the top parts of the model that include the more dynamic *situational influences* will now be discussed.

The situational influences also consist of three layers. However, like pyramids do, also this model gets narrower towards the tip. Whereas the bottom half consists of eight boxes, the top half has only four. *Layer III*, called *Situated Antecedents*, has two boxes: *Desire to Communicate with a Specific Person* and *State-Communicative Self-Confidence*, which, according to the model, are the direct precursors to L2 WTC (MacIntyre et al. 1998, 548). These two variables belong to *situational variables* since the person's communicative self-confidence could be anything between extremely high and very low, depending on how familiar the L2 user is with the topic of discussion. In addition to the topic of conversation, another variable that changes from situation to situation is the other person or persons in the communication situation. Even if the L2 user feels very good about the topic of discussion, they might still not want to speak due to some other person or the amount of people in that conversation. This works vice versa also: the L2 user could feel unconfident about the topic but proceeds to communicate since they want to appear better in the eyes of the other person.

As mentioned above, being willing to communicate with the other person and state-communicative self-confidence lead directly to L2 WTC, which is in Layer II called

Behavioral Intention (MacIntyre et al. 1998, 547). The model could end here, as the purpose of the model is to explain what factors lead up to L2 WTC. However, the tip (*Layer 1*) of the pyramid belongs to the actual L2 use, which is *Communication Behaviour*. One could be confused as to why L2 WTC and L2 are on different levels of the model. The reason for this is that even though the person is willing to communicate, they do not communicate because of restrictions coming outside and not inside of them, like most variables in the layers below. MacIntyre et al. (1998, 548) name a situation where the teacher asks all students wanting to answer to raise their hands. Even if ten students raise their hand to show the teacher they want to answer and are willing to communicate, only one of them gets to answer and, therefore, reaches the top of the pyramid. Next, the teacher perspective of this thesis will be reasoned, the recipients of this study are introduced, the interview they took part in, and the analysis of it.

4 Data collection and analysis

This chapter aims to offer more detailed information about the research in question. In 4.1, the respondents of this study, the teachers, and their expertise in evaluation are discussed. After that, in 4.2, the interview, which they all individually participated in, is described with the help of a figure. Finally, in 3.3, the data analysis process is explained.

4.1 Teachers assessing student L2 WTC

Assessment is a crucial concept in general and second language pedagogy and is viewed as a pivotal tool for teachers. Since teachers are professionals in assessment, they were chosen to be the point of view of this study. In everyday life, the concept of assessment is often understood in terms of numerical assessment given to students after exams and tests. However, inside academia and practical pedagogy, assessment is a much broader concept that entails “all activities teachers use to help students learn and to gauge student progress” (Hamp-Lyons 2016, 13). Thus, the concept covers not only the traditional numerical assessment of tests and exams but also assessment methods such as self-assessment, peer assessment, observation, verbal feedback, guidance, and projects (Lintunen and Veivo 2015, 162). Constant assessing is also a tool for the teacher to get feedback on whether the teaching has been successful. To be able to simultaneously assess all students in addition to teaching methods and materials, teachers must have excellent assessing skills.

Assessing teaching material is especially important when introducing new methods and tools for learning. Since Elias robot is a recent addition to learning environments and an economic investment for the school, teachers must be able to justify the benefits of its use to the decision makers with personal user experience along with the scientific research behind it. The assessment described earlier in this section requires strong professional competence, which is already considered in teacher training. Therefore, teachers using Elias robot have professional and reliable real-life experience of the effects of using the robot to improve L2 WTC, which is why the possible impacts of Elias robot are looked at from the teacher perspective.

The data for the study were collected from five teachers who have used Elias robot in their teaching. In order to get an in-depth understanding of the teachers' views, they were interviewed individually on Zoom. It was appreciated that the group of teachers interviewed would represent a wide variety of teachers that use Elias robot in their teaching. Hence, the

group consists of teachers with different amounts of teaching experience. They teach different subjects to students of various school grades and levels. They were contacted with the help of my contact person from Utelias Technologies Ltd., and a message about the study where volunteers were sought to take part was sent to them. Before the interviews, the teachers were given the Privacy Notice of Processing Personal Data in this study. Before sending the privacy notice, it was reviewed and accepted by a cybersecurity specialist. All teachers interviewed consented to the terms considering processing their personal data in the study. To keep the teachers' and, therefore, their students' identities hidden, the recorded interviews were transcribed and edited so that all direct identity information, such as names, were changed to numbers that could not be traced back to the name. From now on, the five teachers are named Teacher 1, Teacher 2, Teacher 3, Teacher 4, and Teacher 5. The teachers' names are listed in the order in which their interviews were conducted.

As was mentioned earlier, teachers with different backgrounds regarding teaching were wanted for this study. This thesis' results and discussion section include translated quotations from the teachers, and it is, therefore, essential to recognize their personal viewpoints to understand them better. Table 1 shows the name of the teacher, the educational level on which they were working when their interview was done, and their teaching experience in general as well as with Elias robot in years. Since the number of teachers using Elias robot in Finland is small, their school subject will not be presented as it could potentially threaten their anonymity. In the discussion part of this thesis, translated comments from the teachers are provided. Together with those comments, their name and the educational level in which they worked at the time of the interview will be presented to ease understanding of their viewpoints.

Table 1. Basic information of the interviewed teachers that is relevant for this study.

	Teaching experience in years	Educational level in which the teacher works at	Teaching experience with Elias robot in years	The language of the subject being taught
Teacher 1	5	Vocational school, early childhood education and care	Less than 1	Finnish
Teacher 2	15	Primary school	5	English, French
Teacher 3	15	Vocational school	1	English, Finnish
Teacher 4	4	Adult education centre	4	English, Finnish
Teacher 5	20	Vocational school	4	Finnish

4.2 The interview

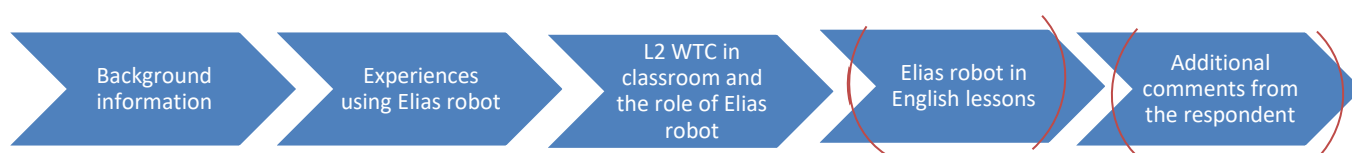
The one-to-one interview was chosen as the data collection method for this thesis, as it offers a chance to get detailed qualitative data from the respondents. The language of the interviews was Finnish. Semi-structured interviews are popular in applied linguistic research since they are planned and somewhat structured. However, the interviewer should modify the questions' wording and order and even add personalized questions to encourage the interviewee to elaborate on their previous answers (Dörnyei 2007, 136.) Since this interview focuses on personal experiences of a specific phenomenon, this type of data collection method was considered suitable for the study.

Conducting a semi-structured interview demands the interviewer to focus on the respondent's answers to guide the interview in the desired direction by making spontaneous questions for the respondent to elaborate on the things they have mentioned. Taking notes of all the answers during the interview would be both time-consuming and unreliable (Dörnyei 2007, 137-139). With different backgrounds in teaching and with Elias robot, some respondents had more

experiences to share than others, which resulted in the interviews taking 20 to 40 minutes. Therefore, all interviews were conducted and recorded on Zoom.

Figure 3 below illustrates how the interview was composed. Before any questions were asked, the topic of this thesis was told to the teacher and they were encouraged to verbalize their thought process and to ask and interrupt if anything seems unclear. At the beginning, the teachers were asked for some background information about their own education and teaching experience. After that, a few questions about using Elias robot were asked. Moving on to the third part of the interview, the term *willingness to communicate* was explained to the teachers, and they were reminded that being willing to communicate does not always equal L2 use. Especially in school settings, students might, for example, raise their hand to show they want to answer, yet only one of the willing ones gets to speak that time. The teachers were asked to think about settings in which their students tend to appear the most and least willing to communicate and the elements of Elias robot they think could increase the students' WTC and correspondingly decrease it. If the teacher had not taught English with the robot, their opinions about applying Elias robot to English teaching were also asked. At the end of the interview, the teachers were given an opportunity to add to their previous answers or make an extra comment in case they felt something essential was not asked or they wanted to add something to their previous answers.

Figure 3. The composition of the interview.



4.3 The analysis

As mentioned above, the recorded data was transcribed to help analyze it. The audio files were uploaded to Microsoft Word, which has a transcription tool. Whereas the tool works well to save time on a time-consuming part of the research, it must be reviewed by a human. Therefore, after the tool was ready with its version of the transcription, each transcription was still further edited to match the actual audio of the interview.

The researcher's self-awareness and reflective stance are important elements in qualitative studies. It is essential to recognize that personal background, biases, and experiences can impact the research process and how data is interpreted. Reflexivity, in this context, refers to being mindful and critically examining one's role in shaping the study. When it comes to my first and third research questions, the analysis of the data was quite simple: The teachers were directly asked whether they felt like Elias had increased their students' L2 WTC. Similarly, the teachers who did not use Elias for teaching English were asked if they felt it would be suitable for learning English. However, if the teacher had used Elias for English teaching, the answers to research question three were found from their whole interview. If the teacher discussed Elias being used for teaching English, that material citation was directly put under the category *research question three* in my category notes. Likewise, the teachers' comments to my first research question, which was directly asked from them, were placed in the category *research question one*. The comments that appear in this study are the ones that either represented similar ideas from multiple teachers or, on the other hand, proposed a differing point of view.

The research material was analyzed using data-driven content analysis (Tuomi & Sarajärvi, 2018, 108-113). In practice, the analysis progressed in such a way that, as the transcribed material was read, those sections were separated from the material, where the interviewees shared their experiences of the effects of the Elias robot on WTC or the lack of it. Once these experiences had been found, they were translated from Finnish to English. In the next step, reduced expressions were formed from these data points so that the thematization of the experiences into broader groups would be possible. Thematization proceeded in two stages: initially, subcategories were created, and broader main categories were then formed based on them. An example of the progression of the analysis from the material to the main categories in this study is described below.

Translated material citation: "And it's not like you really have to be afraid that you'll get the wrong answer and then somebody will laugh at you. That there's such a thing like that, the fear of answering wrong disappears".

Reduced expression: The learner does not need to worry about answering wrong due to an emotionally safe learning environment.

Subcategory: No fear of wrong answers

Main category: Emotional safety

Based on the analysis, three main categories were created. These categories are called *increased motivation, emotional safety, and approachability*. Regarding the first and the third research questions, the analysis only contained the first two steps of the data-driven content analysis. Now that the analysis and the material to be analyzed have been explained, I will move on to the next part of the thesis, results and discussion.

5 Results and discussion

In order for the handling of the results to be clear, the results are looked at one research question at a time. As stated at the beginning of this thesis, the research questions are:

1. Has Elias robot increased the students' willingness to communicate in the target language from their teachers' point of view?
2. How does Elias increase learners' L2 willingness to communicate from the teacher perspective?
3. How could Elias-robot increase the students' willingness to communicate in English based on the teachers' opinions?

The answers to the questions will be looked at in the order the questions appear in the listing above. Each research question will have its own subsection in the text, and the second research question will have an additional three subsections, one for each theme found.

5.1 Has Elias robot increased the students' willingness to communicate in the target language from their teachers' point of view?

At the beginning of the interview, all teachers were asked whether they felt Elias robot had affected their students' target language WTC. Every teacher answered without hesitation that they had observed Elias has positively impacted their students' L2 WTC when Elias is brought to the classroom.

1. It has a huge impact on willingness to communicate. As soon as Elias is in the classroom, the students are already trying to speak to it even when it is not ready yet. I have to tell them to wait a second and explain that Elias has been asleep and I am currently waking him up. So, the willingness to communicate with it really comes automatically. Moreover, very rarely there is a student who does not want to speak with it.

Teacher 4, adult education

2. Even the kind of students who probably even themselves acknowledged that their speaking could have been more fluent did not hesitate to work with Elias.

Teacher 3, vocational school

The reasons behind teachers perceiving the positive impacts of Elias robot on their students' L2 WTC will be further explored when addressing my second research question. However,

their comments support the assumption that HRI could be applied to general linguistic models since they reveal that students treat Elias robot as an expected learning companion the students are happy to welcome into their classroom and want to converse with. Hsieh, Yeh, and Chen's (2023) study suggests that learner's WTC improved after learning a language with a language-learning robot or another tangible object, which is in line with these teachers' experiences with their students' L2 WTC. Since the interviews were semi-structured, not all teachers were asked the same questions. One teacher was asked whether they felt the students' raised L2 WTC continued to situations where they should use their L2 without Elias robot being present.

3. "It specifically improves willingness to communicate in real-world situations, because the student has practiced a similar situation with Elias robot and felt encouraged after succeeding. Then it is easier to use the language in real-life situations."

Teacher 4, adult education center

This observation from Teacher 4 is comparable to the results of the studies from Chang & Chen 2010 and Wang, Young & Jang 2010. When the student felt encouraged to speak with the robot, they were more eager to form linguistically more challenging sentences, which improved their language skills and gave them self-confidence. One of the teachers went further to consider whether there are other factors in those learning situations with Elias that could also explain the increased L2 WTC.

4. Maybe there is also the thing that when working with Elias, the students are in a smaller group with it and therefore, they have the courage to use it.

Teacher 2, primary school

More comments like the one above will be presented when discussing research question 2. However, comment 4 from Teacher 2 was added here, since Elias robot, like any other learning tool, is not used in a vacuum. It is important to consider what are the impacts of the robot itself, its pedagogy, and technology, and what is the result of the environment in which it is used in. In their pyramid model, MacIntyre et al (1998, 546-547) portrayed the possible variables of L2 WTC which could be divided into factors that remain stable over time and communication situations, and to those that can change drastically in a short period of time based on the speaker's interpretation of that situation, called situational influences. The teachers noticing that the students have a stronger L2 WTC when interacting with Elias could

indicate it affects the students' situational influences. Situated Antecedents called Desire to Communicate with a Specific Person and State Communicative Self-Confidence are located directly under WTC in the Pyramid model of MacIntyre et al (ibid.). The specific person a student wants to communicate with could be Elias robot, since although it is not a person, a recent study from Peura and Johansson (2023) revealed that Finnish L2 learners of French from 3rd and 5th grades viewed Elias as a hybrid of a machine and a human: they knew it was a robot with no emotions, yet they felt it had its own persona. When interviewing the teachers about the use of Elias for my study, many of them told they like to use it with group tasks. It does not work ideal with big groups, since it struggles with voice recognition when there are many people speaking at the same time. By using Elias with a smaller group, the teachers might consciously or subconsciously enable the students to have a learning situation where they have a stronger State Communicative Self-Confidence due to having less people in the communication situation with them. The students having the desire to speak with Elias together with feeling self-confident in the situation could explain why the teachers feel like using Elias has increased their students L2 WTC.

Therefore, the answer to my first research question is that yes, Elias robot has increased the students' willingness to communicate in the target language from the teachers perspective. Now that the answers to my first research question have been presented and discussed, I will move on to my second research question and the discussion of its results.

5.2 Why does Elias robot increase learners' willingness to communicate from teacher perspective?

Based on the data-driven content analysis, the teachers' experiences about Elias robot ended up dividing to three main categories *increased motivation, emotional safety, and approachability*. Although the teachers mentioned other things about Elias robot and its impacts, these three were the main themes that were each mentioned by at least four teachers. Many of the comments, however, were quite multi-faceted. What I mean by this is that e.g., some comments that have been marked under the category *raised motivation* include discussion about *approachability*. Therefore, it is important to see these themes as exploratory lines that together compile why the teachers feel Elias robot has increased their students' L2 WTC. Now, each of these themes is explained as a dialogue of the teachers' comments and previous research.

5.2.1 Increased motivation

Out of all five teachers, increased student motivation was brought up very early on in the interview. When it comes to L2 WTC, feeling motivated about learning the language is crucial, since according to Alemi, Meghdari, and Gazisaedy (2015), it decreases speaking anxiety, which has a strong positive impact on increasing L2 WTC based on Shanti-Manipushpika (2018). The teachers interviewed explained in their comments that as soon as Elias was introduced to the classroom, students of all ages have been very excited about it. The teachers tended to contrast the reception they get when entering the classroom saying the students are way more eager to start communicating with Elias robot than what they would be with them.

5. It is somehow exciting and cool. And when you say something to [Elias robot], then it answers to you and somehow like it is not nearly as exciting that the teacher answers you so having the robot there, it could then motivate students.

Teacher 1, vocational school

6. [The students] are thinking what Elias will do next a lot! Let's expect that now it might do something different than that teacher over there would ever do in this situation.

Teacher 5, vocational school

As the comments above show, the teachers contrasted the students' WTC with the robot a lot with how the students would interact with them. Ahtiainen and Kaipainen's (2020) study on Elias robot's roles revealed that young learners viewed the robot to be a learning companion rather than a teacher. Although not a topic of this research, the five teachers did not contrast Elias robot to a student's peers but to themselves, which could indicate that the teachers think of Elias robot as another teacher. In Ahtiainen and Kaipainen's (2020) study the students found Elias to be motivating because of its versatile teaching methods but also due to the excitement it gave them. This is in line with the teachers' comments that based on their observations, Elias as a learning tool is so motivating to students that they are happy to learn with it despite the topic.

7. We did this kind of recap exercise [with Elias] with the students and they got excited and were a bit competitive when answering the questions. It seemed to me that if I had just given an exercise sheet about the same topic, they would have not done it with as much excitement, even though the same things could have been asked with it.

Teacher 1, vocational school

When comparing these experiences and the comments provided by Teacher 1 to The Heuristic Model of Variables Influencing WTC (MacIntyre et al, 1998) that was earlier explained and portrayed in chapter 3.2, similarities are noticeable. Interpersonal Motivation and Intergroup Motivation lay together with L2 Self-Confidence on the 4th Layer of the model of MacIntyre et al (ibid.). Feeling motivated about learning the language and engaging in the conversation with another interlocutor leads to increased self-confidence. Interpersonal and Intergroup Motivation refers to the motivation to speak with another person and to be a part of that language group function as a base for the actual desire to communicate with a specific person. That urge is again crucial to the intention to use the language, known as WTC.

Increased motivation could also be seen as persistence of learning in addition to excitement. This can be linked to comment 6 from Teacher 1, in which they said the type of exercise or topic did not matter since learning with Elias robot was motivating alone. The teachers mentioned that the students enjoyed these situations, which motivated them to keep trying.

8. That kind of persistence. It came naturally. Somehow, they would be motivated to speak the language, even though I knew that it was super difficult.

Teacher 3, vocational school

When asked about possible problems in maintaining motivation, the teachers unanimously thought the students did not lose their interest over time with Elias. However, at the beginning of the interview, they were asked how often they used Elias with a specific class, and none of them used Elias more than once a week on average with the same class. If Elias robot was used in every lesson, their comments could have been different.

Some teachers also noted that Elias robot made the learning atmosphere fun. The pleasant ambiance did not change for the worse when Elias robot was utilized only during, for example, the beginning of the lesson, but it carried out for the rest of it, too.

9. There is that side of Elias also that it is not just about the lessons, but it is also really good in creating a great atmosphere for learning a particular topic because it also has songs, poems, and games, and it is really good with younger learners to take a moment doing those. Having a moment to create a good vibe around the topic and not just learning.

Teacher 2, primary school

10. Then we all laughed a bit and looked how the students should put their tongues and twist them. And also the exact sound that needs to be very clear here for the robot to understand.

Teacher 3, vocational school

This also reveals a challenge the teachers mentioned they had faced when using Elias in their teaching: it sometimes struggles to understand what is said to it. This will be discussed in more detail next when the second theme, emotional safety, is explained.

5.2.2 Emotional safety

According to Utelias Technologies Ltd., one of the three guiding lines of the pedagogy behind Elias robot is that it “creates a safe and happy learning environment, encourages to speak and there is no need to worry about mistakes.” As could already be seen in some of the teachers’ comments regarding raised motivation, the students did not worry about wrong answers. In the analysis of the material, emotional safety consists of three categories: *positive feedback*, *no fear of wrong answers*, and *safe learning environment*. The chosen comments from the teachers will be presented in that order.

Previously, in *raised motivation* section of the results, an experience from Teacher 5 was shared where they said the students are enthusiastic about the reactions of Elias robot. Not only are the reactions different from what could be expected from a human teacher, but they are also always positive.

11. The robot only gives positive feedback, so there is no feeling of disappointment when answering wrong.

Teacher 2, primary school

12. It is easier to answer a robot than a teacher because there is no fear of losing one’s face if they answer wrong.

Teacher 1, vocational school

13. There is a feeling of safety, and the setting is different than if there was a teacher with the student. Even though Elias speaks English perfectly, it is not considered a judgmental teacher who gives you feedback. It lets you try.

Teacher 3, vocational school

14. [The students] are more encouraged to speak, and somehow, they are not afraid of pronouncing something wrong.

Teacher 5, vocational school

Positive feedback leads to not being afraid of answering wrong. The learning situations seem to feel more private with Elias robot. The teachers mentioned that not being afraid resulted in the students communicating with Elias even when unsure whether their answer would be right or wrong. They would, thus, be more experimental with complex sentence structures and word choices. Succeeding in an emotionally safe learning environment would give them the courage to apply the practiced things to discussions and texts they wrote. Similar findings have been previously found by Chang & Chen (2010) and Wang, Young & Jang (2013). In their studies, making mistakes in front of the robot was viewed as less embarrassing than making the same mistakes in front of a peer or a teacher. Furthermore, positive experiences gained in language learning situations resulted in becoming a more effective language learner. Teacher 4 compared the effects of Elias robot to learning a language with school dogs as follows:

15. It is kind of the same as when somebody wants to talk to a dog; I think the impact is the same. However, I would say that robots are spoken to even more than animals, because somebody might be afraid of animals, but I have never met anyone who would have been afraid of the robot.

Teacher 4, adult educational center

Dogs, like Elias, do not have negative expectations towards the students, and there is no judgment. Whereas, according to the teachers, no students had been reported to be afraid of Elias, being afraid of dogs is not uncommon. In addition, as mentioned in a previous comment from Teacher 3, unlike animals, Elias robot provides a fluent language model. Based on studies about people not viewing robots as just machines but thinking of them as personalities with feelings and opinions (Belpaeme et al 2013, 452), it is surprising that the teachers think students realize Elias robot does not have emotions. However, it should be noted that children are more inclined to anthropomorphize social robots. Consequently, even though these educators assume their students understand that Elias lacks emotions, this assumption may not be accurate. However, even if the learners imagine Elias robot having emotions, it is not controversial that Elias does not give negative feedback or laugh if a learner makes a mistake.

The third category under emotional safety is safe learning environment. The main and subcategory names are very close to one another, but the examples from the teachers provided next will demonstrate the meaning of a safe learning environment.

16. We have practiced real-life communication skills with students [...] with the help of the robot. [...] The robot is acting really mean; it curses and says racist things, and then the students need to interact with the robot to get it out of the situation. Moreover, seeing how the students react to being provoked has made it fun for them. It is a thing that cannot be practiced with a teacher. And because the robot is small, everybody knows that even if it uses very hard language and is mean, it is not a person. The student knows that. It is just a robot; it hurts less, and they are going to experience these situations in their work lives later.

Teacher 4, adult education centre

This experience is an example of how the learning contents of Elias robot can be created to practicing even things that would be hard or controversial to practice with another person. The exercise Teacher 4 explained was created to provide students a physically and emotionally safe learning environment. Teacher 5 also mentioned the importance of an emotionally safe learning environment and even directly applied its influences to WTC in their comment below.

17. How well the students know one another and how safe they sense the atmosphere affects their willingness to communicate. They sense if you dare to say things there, and interrupt, and speak, and it is the same for even adults. That is a thing that affects. Nevertheless, Elias is wonderful in that sense that it makes the situation relaxed, especially when the robot is a bit newer to those students; you always notice it makes the atmosphere more relaxed when there is something different and new included.

Teacher 5, vocational school

However, the teachers felt communication errors with Elias could negatively impact emotional safety. They reported having students who felt sad and unsuccessful if Elias robot did not understand what they were trying to say. Similar comments about problems with speech recognition were given by the two teachers Honkalammi (2022) interviewed for her study. Teacher 5 agrees Elias does not always understand what the students are trying to say but continues as follows:

18. It also depends a lot on how you have created things for it. Or at least I have noticed it. It takes time, but you learn to know what kinds of things you should do and what to avoid, like how to make Elias work as in how you are programming it to work. So, all of this is really important as a teacher, but the knowledge comes together with user experience.

Teacher 5, vocational school

Although problems with voice recognition can be avoided, it requires the teacher's experience, knowledge, and technological understanding. Teachers are professional assessors of their students' skills, but they also have to constantly assess themselves as teachers as well as the teaching material they use. Hence, if a teacher notices that Elias robot fails to establish an emotionally secure learning environment due to speech-recognition errors for some students, an alternative teaching method should be considered. Alternatively, as mentioned by Teacher 5 in a previous comment, adjustments to the nature of exercises conducted with Elias can be explored.

When comparing the findings to the Heuristic Model of Variables Influencing WTC (MacIntyre et al., 1998), getting to practice language skills in an emotionally safe environment can have effects on L2 Self-Confidence, as well as State Communicative Self-Confidence. The pyramid model, which can be seen on page 15 of this thesis, is supposed to be interpreted so that the variables that appear higher are based on the variables that are located on the base of the figure. However, in previous studies (Chang & Chen, 2010, and Wang, Young & Jang, 2013), an emotionally safe learning environment improved the learners' language skills in general, which refers to the Communicative Competence box on the model. The Communicative Competence box is located on the second lowest part of the pyramid, underneath L2 Self-Confidence, which, in turn, is below State-Communicative Self-Confidence. State-Communicative Self-Confidence, together with Desire to Communicate with a Specific Person, lay directly underneath Willingness to Communicate.

5.2.3 Approachability

The teachers generally found the robot very easy to approach, and therefore, many students wanted to speak with it. They found it to be a very positive thing that it is a humanoid robot.

19. Foremost, it encourages them to speak. The students get to speak to the robot because they want to and not even consider that they might learn something while doing so.

Teacher 4, adult education centre

Teacher 4 indicates above in comment 19 that students might experience incidental learning with Elias since they think they are just communicating with it and not learning a language.

As shown in Figure 1, the sizes of the humanoid robots Elias can be used with are relatively small, varying from 58 to 121 centimeters (SofBank, 2023; Aldebaran, 2023). The robot's

size provoked differing opinions among the teachers. It was unclear which of the three types of humanoid robots each teacher had used Elias with.

20. It is very small, and we thought that if you were to teach, let us say, English with the robot, and you would do exercises, and that would not go well. Could there be a student who would, for example, throw the robot out of the window, which is something the student could not do to a teacher. Because of its size, it does not have a strong authority, and also, it is so kind. The lack of authority could be a problem for vocational school students, but for kindergarteners, there could be some authority despite the size. Especially older students could think “whatever” and kick it or something.

Teacher 1, vocational school

Teacher 4, on the other hand, finds the small size to be nothing but a good thing and explains why it should not be larger:

21. I only see positive things about Elias being relatively small in size. It is a humanoid robot that can move. If you were somewhere and then in the corridor, a humanoid robot that is the same size as you walks towards you; you would not feel good about it. It could be scary to some people, especially if you happen to be even smaller than the robot there.

Teacher 4, vocational school

As was discussed earlier in 5.2.1, the teachers seemed to compare the robot to themselves as teachers. Teacher 1 was concerned about the robot’s size and the lack of authority. Their concern about the robot not having authority seems valid. However, it is another question whether the robot should even have it. As stated before, the purpose of RALL is that the robot is assisting the learning process, and the robots are not designed to replace a teacher (Ao and Ju 2022). Humanoid robots are usually costly machines that should be used under the teacher’s observation. Especially those teachers who teach younger learners educate their students about good behavior and community policies in addition to the actual learning contents of different school subjects. The humanoid learning robots, however, do not take part in educating students about treating others or assessing their behavior. Hence, the human teachers in the learning situation are in charge of their students’ actions. It could be true that bigger robots would perhaps have a stronger authority. However, as teacher 4 describes in comment 19, a big robot could be scary to many students. The relationship between emotions and learning has been studied widely, and the emotionally secure learning environment fostered by Elias robot is regarded as a pivotal factor contributing significantly to enhancing L2 WTC.

The teachers describe in their comments that it is easy to identify with a humanoid robot, but at the same time, they also know it is not a human. They describe it as almost like a child because of its small size. Teacher 2 also finds the human-like character easy to identify with and, therefore, easy to approach. Despite age, people have a tendency to think of social robots as characters with their own personalities, instead of thinking of them as machines (Belpaeme et al 2013, 452). Similar comments are heard from another teacher, who compares Elias robot to other electronic learning tools:

22. I feel like if I were to start leaning a new language, I think Elias would be the best tool for that. I have now tried other virtual learning things and then other mobile games and so on, but it is not the same thing. The moment feels so real when you have that kind of character there, who can, in my opinion, engage to good communication with you.

Teacher 3, vocational school

When, again, trying to set the teacher's experience to the Heuristic Model of Variables Influencing WTC (MacIntyre et al. 1998, 548), the urge to engage with the robot indicates to the Desire to Communicate With a Specific Person, the person in this case being Elias robot. In their comments, the teachers sometimes, accidentally or on purpose, talked about Elias with a different name. It turned out that in many schools, the robot was not, in fact, called Elias but something else that typically matched the language it was used to teach. The exact name of the robot will not be mentioned here to help secure the teacher's identity. However, in Peura and Johansson's (2023) study, the Elias robot of the group studied was called Dominique or Domi for short, which emphasizes that the robot is viewed as an individual.

Now that the results of my second research question have been presented and discussed, my third and last research question will be handled next.

5.3 Could Elias robot increase the students' L2 willingness to communicate in English based on the teachers' opinions?

The answer to whether the teachers think Elias robot could improve L2 WTC among students in English is yes. Some of the teachers interviewed did use Elias robot to teach English. Without exception, all teachers thought the language being taught with Elias robot does not change their experiences, but all of their comments could be applied to learning any language.

23. It works just as well in any language. It is based on looking, repeating, and remembering words that are then used in a dialogue with the robot.

Teacher 4, adult education center

What makes Elias work does not seem to depend on the language but on the pedagogy and methods. All teachers answered without hesitation that it would work great for teaching English.

Teacher 2 has noted that some students are incredibly skilled in English nowadays, whereas some students need more support to keep up with the rest of the group. With these kinds of groups, it is important to provide skilled students with exercises that they can do without feeling they are being punished with extra work. On the other hand, the students needing more support might require more time and peace to learn.

24. Well, it works nicely for differentiation. You can make more challenging lessons and harder chatting [for skilful English learners]. Differentiation [to support the learning of the students that struggle to keep up with the rest of the group] with Elias is more like drilling the vocabulary, whereas [for skilled learners] it is training more complex communication.

Teacher 2, primary school

Naturally, the teachers' viewpoints vary since their education goals are different as they teach on different levels. Teacher 1, who works in a vocational school, started thinking about combining English with the practical skills their students will need when facing people in the future as professionals in their field.

25. Foreign languages are not very spoken in this area, so it would be great for the students to practice those language skills with the robot.

Teacher 1, vocational school

Despite the point of view, the teacher had found or could imagine Elias to be very suitable for teaching English. After all, when gathering together the answers for research questions one and two, the teachers' comments about their students' L2 WTC indicate that Elias robot affects their L2 WTC mostly on Layers IV and III, that are called Motivational Propensities and Situated Antecedents presented on the Heuristic Model (MacIntyre et al, 1998). These two layers are the layers below Willingness to Communicate, and their five boxes handle motivation, L2 self-confidence, and the desire to communicate with another individual. In order for the language user to be willing to use the language based on the Heuristic Model (ibid.), they should, among other things, have motivation, self-confidence, and willingness to speak to another interlocutor. Therefore, the teachers' confidence about Elias robot works just as well despite the language seems valid. The model excludes nor includes any specific

languages, but it can be applied to all languages. Having the results of all three research questions discussed, the next part of this thesis will conclude the research by summarizing the study, naming its limitations, and offering opportunities for further research.

6 Conclusion

In the final part of this thesis, I will conclude the most important findings of the thesis and answer my research questions. The limitations of the research will also be considered. Lastly, I will give some suggestions for future research around the topic.

The primary purpose of this thesis was to study the potential influence of Elias robot on language learners' second language (L2) willingness to communicate (WTC) from the perspective of their teachers and the assumed reasons behind the possible effects. In addition, this study aimed to assess the potential of the Elias robot to increase students' L2 willingness in English from the teachers' point of view. This thesis offers a new viewpoint by combining robot-assisted language learning and WTC, which appear to be studied little together, as only one previous study combining the two could be found. The information for my thesis was gathered through a semi-structured interview done in Zoom. Five Finnish teachers with different teaching backgrounds regarding the level in which they currently teach, their subject, the amount of previous teaching experience, language of instruction, and experience with Elias robot were interviewed individually.

The first research question sought to determine whether the teachers observed that Elias robot had impacted their students' L2 WTC. All five teachers were one-minded when asked about the possible effects: they all felt confident that Elias had positively impacted their students' L2 WTC despite the learners' age or current educational level. It was also considered whether Elias robot increases the students' L2 WTC or if it is the effect of the smaller group the students often work in when learning with Elias robot. Due to the lack of studies combining WTC and RALL, comparing the findings to previous research was challenging. This finding, however, aligns with the Heuristic Model of Variables Influencing WTC (MacIntyre et al. 1998), acknowledging the role of situational influences and situated antecedents in fostering language use.

Regarding my second research question, the aim was to find possible explanations for why Elias robot increases student L2 WTC based on the teachers' opinions. Data-driven content analysis identified three main themes: increased motivation, emotional safety, and approachability. Based on previous research, students learning with robots have felt more motivated than a group learning without one. Although the goal of RALL is to support a human teacher instead of replacing one, the teachers were quick to compare how their

students communicate with them and the robot. They felt that despite the topic, the students were eager to communicate with Elias robot as soon as it was brought to the classroom. However, they reported that sometimes the students can get frustrated since there are problems with the voice recognition of Elias robot, resulting in having the students repeat the same things multiple times. Since Elias only gives positive feedback, the teachers assumed their students to feel emotionally safe when learning with Elias. They think their students are well aware it is a robot, and it cannot, therefore, make assumptions or have negative feelings towards a student despite their language skills. The effects were compared to having a pet as a learning companion. According to the teachers, the third theme, approachability, essentially makes their students want to speak with Elias robot. As was stated previously, the students know it is a robot, yet they still find it easy to identify with, since it is a humanoid robot with a head, face, and body. The teachers had differing opinions considering the size of the robot. Although some thought it would be good for the robot to be bigger, so that it would not be so vulnerable if violence towards it were to occur, most thought the robot's small size makes it easy to approach since it is a machine, after all. The teachers' experiences resonate with the Heuristic Model (MacIntyre et al. 1998), particularly in terms of interpersonal and intergroup motivation contributing to increased self-confidence and, subsequently, WTC. The emotional safety created by Elias was deemed crucial in encouraging students to express themselves without fear of judgment.

The purpose of my third research question was to find out how teachers feel Elias robot could also improve student WTC in English. The teachers did not hesitate to answer that the impacts of Elias robot are not tied to any language but apply to all languages that can be learned through Elias robot. The robot was perceived as a valuable resource for differentiation, catering to students with varying language proficiency levels.

While this study offers valuable and new insights, it is important to recognize certain limitations. The relatively small sample size, involving only five teachers, might not fully capture the diverse range of experiences. Therefore, future research could benefit from a more extensive and diverse group of participants. Additionally, collecting user experiences from the students themselves would offer a more comprehensive understanding of how Elias influences WTC. In conclusion, this research sets the stage for further exploration of the role of humanoid robots in language education and how they can impact student WTC.

References

- Aldebaran. "Press kit". Accessed November 7, 2023.
<https://www.aldebaran.com/sites/default/files/press-kit/NAO-press-kit-EN.pdf>
- Ahtiainen, Aino and Kirsikka Kaipainen. 2020. "Learning and Teaching Experiences with a Persuasive Social Robot in Primary School – Findings and Implications from a 4-Month Field Study." In: Gram-Hansen, S., Jonassen, T., Midden, C. (eds) *Persuasive Technology. Designing for Future Change*. PERSUASIVE 2020. Lecture Notes in Computer Science, vol 12064. Accessed May 30, 2023. Springer, Cham.
https://doi.org/10.1007/978-3-030-45712-9_6
- Alemi, M., A. Meghdari, and M. Ghazisaedy. 2015. "The impact of social robotics on L2 learners' anxiety and attitude in English vocabulary acquisition." *International Journal of Social Robotics* 7, no. 4: 523–535. Accessed June 10, 2023.
<https://doi.org/10.1007/s12369-015-0286-y>
- Alimisis, Dimitris, and Chronis Kynigos. 2009. Teacher education on robotic-enhanced constructivist pedagogical methods. Athens, School of Pedagogical and Technological Education. Accessed June 10, 2023. https://roboesl.eu/wp-content/uploads/2017/08/chapter_1.pdf
- Ao, Yutong, and Zhonggen Yu. 2022. "Exploring the Relationship between Interactions and Learning Performance in Robot-Assisted Language Learning." *Education Research International* 2022, 1-13. Accessed August 4, 2023.
<https://doi.org/10.1155/2022/1958317>.
- Baker, Susan C., and Peter D. MacIntyre. 2003. "The role of gender and immersion in communication and second language orientations." *Language Learning* 53, no. S1: 65–96. Accessed May 15, 2023. <https://doi.org/10.1111/0023-8333.00224>
- Bartneck, Cristoph, and Jodi Forlizzi. 2004. "A Design-Centred Framework for Social Human-Robot Interaction." In *RO-MAN 2004. 13th IEEE International Workshop on Robot and Human Interactive Communication*, 591–594. NEW YORK: IEEE, 2004. Accessed June 10, 2023. IEEE Xplore.
- Belbaeme, Tony, Paul Baxter, Joachim de Greeff, James Kennedy, Robin Read, Rosemarijn Looije, Mark Neerinx, Ilaria Baroni, and Mattia Coti Zelati. 2013. "Child-Robot Interaction: Perspectives and Challenges." In: Herrmann, G., Pearson, M.J., Lenz, A., Bremner, P., Spiers, A., Leonards, U. (eds) *Social Robotics. ICSR 2013. Lecture*

- Notes in Computer Science, vol 8239. Springer, Cham. Accessed November 10, 2023. Springer.
- Breazeal, Cynthia. 2003. "Toward Sociable Robots." In *Robotics and Autonomous Systems* 42, no. 3–4: 167–175.
- Cerrato, Loredana, and Nick Campbell. "Engagement in Dialogue with Social Robots." In *Dialogues with Social Robots*, 427:313–319. Singapore: Springer Singapore, 2017. Accessed August 28, 2023. Springer.
- Chang, Chih-Wei, and Gwo-Dong Chen. 2010. "Using a humanoid robot to develop a dialogue-based interactive learning environment for elementary foreign language classrooms." *Journal of Interactive Learning Research* 21, no. 2: 215-235.
- Chang, Chih-Wei, Jih-Hsien Lee, Chin-Yeh Wang, and Gwo-Dong Chen. 2010. "Improving the authentic learning experience by integrating robots into the mixed-reality environment." *Computers and Education* 55, no. 4: 1572–1578. Accessed June 4, 2023. <https://doi.org/10.1016/j.compedu.2010.06.023>
- Coppin, Ben. 2004. "Artificial Intelligence Illuminated." Jones & Bartlett Learning.
- Dörnyei, Zoltán. 2007. "Research Methods in Applied Linguistics: Quantitative, Qualitative, and Mixed Methodologies." Oxford: Oxford University Press, 2007.
- Hein, Marika, and Dan Nathan-Roberts. 2018. "Socially Interactive Robots Can Teach Young Students Language Skills; a Systematic Review." *Proceedings of the Human Factors and Ergonomics Society* 62, no. 1 (2018): 1083–1087. Accessed June 20, 2023. Sage Premier.
- Hamp-Lyons, Liz. 2016. "Purposes of assessment". In Tsagari Dina, and Jayanti Banerjee eds. *Handbook of Second Language Assessment*. 13–27. 1st ed. Vol. 12. Germany: De Gruyter, 2016. Accessed: June 3, 2023. ResearchGate.
- Honkalammi, Hilla-Marja. 2022. Kokemuksia robotista kieltenopetuksessa. *Kieli, koulutus ja yhteiskunta*, 13, no.1. Accessed June 12, 2023. <https://www.kieliverkosto.fi/fi/journals/kieli-koulutus-ja-yhteiskunta-helmikuu-2022/kokemuksia-robotista-kieltenopetuksessa>
- Honkalammi, Hilla-Marja, Outi Veivo, and Marjut Johansson. 2022. "Advice-giving between young learners in robot-assisted language learning." FRIAS Junior Researcher Conference: Human Perspectives on Spoken Human-Machine Interaction (SpoHuMa21), University of Freiburg (online), 15–17 November 2021. Accessed June 12, 2023. <https://doi.org/10.6094/UNIFR/223816>

- Hong, Zeng-Wei, Yueh-Min Huang, Marie Hsu, and Wei-Wei Shen. 2016. "Authoring Robot-Assisted Instructional Materials for Improving Learning Performance and Motivation in EFL Classrooms." *Educational technology & society* 19, no. 1: 337–349. Accessed May 25, 2023. EBSCOhost.
- Hyun, Eun-ja, So-yeon Kim, Siekyung Jang, and Sungju Park. 2018. "Comparative Study of Effects of Language Instruction Program Using Intelligence Robot and Multimedia on Linguistic Ability of Young Children." In *17th IEEE International Symposium on Robot and Human Interactive Communication, 1- 2*: 187–192. NEW YORK: IEEE. Accessed June 2, 2023. IEEE Xplore.
- Iio, Takamasa, Ryota Maeda, Kohei Ogawa, Yuichiro Yoshikawa, Hiroshi Ishiguro, Kaori Suzuki, Tomohiro Aoki, Miharuru Maesaki, and Mika Hama. 2019. "Improvement of Japanese adults' English speaking skills via experiences speaking to a robot." *Journal of Computer Assisted Learning* 35, no. 2: 228-245. Accessed June 2, 2023. <https://doi.org/10.1111/jcal.12325>
- Kanda, Takayuki, Takayuki Hirano, Daniel Eaton, and Hiroshi Ishiguro. 2004. "Interactive Robots as Social Partners and Peer Tutors for Children : A Field Trial." *Human-computer interaction* 19, no. 1–2: 61–84. Accessed May 15, 2023. EBSCOhost.
- Khalifa, Albara, Tsuneo Kato, and Seichi Yamamoto. 2019. "Learning effect of implicit learning in joining-in-type robot-assisted language learning system." *International Journal of Emerging Technologies in Learning (iJET)* 14, no. 2: 105–123. Accessed May 15, 2023. <https://pdfs.semanticscholar.org/8a59/c32ad4e2a623b3b2954d363db5e97aba7228.pdf>
- Kouri, Susanna, Ellinoora Köpman, Aino Ahtiainen, and Millan Valentina Ramirez. 2020. "Customized Robot-Assisted Language Learning to Support Immigrants at Work: Findings and Insights from a Qualitative User Experience Study." In *Proceedings of the 8th International Conference on Human-Agent Interaction (HAI '20)*. Association for Computing Machinery, New York, NY, USA, 212–220. Accessed June 3, 2023. <https://doi.org/10.1145/3406499.3415065>
- Lee, S., Noh, H., Lee, J., Lee, K., Lee, G. G., Sagong, S. & Kim, M. 2011. "On the effectiveness of robot-assisted language learning." *ReCALL*, 23(1), 25–58. Accessed June 4, 2023. ProQuest Central.
- Leeuwestein, Hanneke, Marie Barking, Hande Sodaci, Ora Oudgenoeg-Paz, Josje Verhagen, Paul Vogt, Rian Aarts, Sybren Spit, Mirjam de Haas, Jan de Wit, and Paul Leseman. 2020. "Teaching Turkish-Dutch kindergartners Dutch vocabulary with a social robot:

- does the robot's use of Turkish translations benefit children's Dutch vocabulary learning?" *Computer Assisted Learning* 37, no. 3: 603-620. Accessed May 31, 2023. <https://doi.org/10.1111/jcal.12510>
- Lintunen, Pekka and Outi Veivo. 2015. "Kuinka kielitaitoa arvioidaan" [How Language Skills are Assessed]. In Pietilä, Päivi and Lintunen, Pekka, eds. *Kuinka kieltä opitaan : opas vieraan kielen opettajalle ja opiskelijalle* [How languages are learned : a guide for foreign language teachers and students], 45–67. Helsinki: Gaudeamus.
- MacIntyre, Peter D. 2007. "Willingness to Communicate in the Second Language: Understanding the Decision to Speak as a Volitional Process." *The Modern Language Journal* 91, no. 4: 564–576. Accessed May 14, 2023. EBSCOHost.
- MacIntyre, Peter D., Richard Clément, Zoltán Dörnyei, and Kimberly A. Noels. 1998. "Conceptualizing Willingness to Communicate in a L2: A Situational Model of L2 Confidence and Affiliation." *The Modern Language Journal* 82, no. 4: 545–562. Accessed May 14, 2023. EBSCOHost.
- Peura, Liisa and Marjut Johansson. 2023. "A Friend or a Machine? A Study on the Child–Robot Relationship in a Foreign Language Class of Young Learners." In *Social Robots in Social Institutions* (pp. 165-173). Accessed October 10, 2023. IOS Press.
- Pietilä, Päivi. 2014. "Yksilölliset erot kielenoppimisessa" [Individual differences in language learning]. In Pietilä, Päivi and Lintunen, Pekka, eds. *Kuinka kieltä opitaan: opas vieraan kielen opettajalle ja opiskelijalle* [How languages are learned : a guide for foreign language teachers and students], 45–67. Helsinki: Gaudeamus.
- Pietilä, Päivi and Pekka Lintunen. 2014. "Kielen oppiminen ja opettaminen." [Language learning and teaching]. In Pietilä, Päivi and Lintunen, Pekka, eds. *Kuinka kieltä opitaan : opas vieraan kielen opettajalle ja opiskelijalle* [How languages are learned : a guide for foreign language teachers and students], 11–25. Helsinki: Gaudeamus.
- Shanti Manipuspika, Yana. 2018. "Correlation Between Anxiety and Willingness to Communicate in the Indonesian EFL Context." *Arab World English Journal* 9, no. 2: 200–217. Accessed May 19, 2023. <https://dx.doi.org/10.24093/awej/vol9no2.14>
- SoftBank. "Robot". Accessed November 7, 2023. <https://www.softbank.jp/en/robot/>.
- Tuna, Ayse and Gurkan Tuna. 2019. "The use of Humanoid Robots with Multilingual Interaction Skills in Teaching a Foreign Language: Opportunities, Research Challenges and Future Research Directions." *Center for Educational Policy Studies Journal* 9, no. 3: 95-115. Accessed May 19, 2023. <https://doi.org/10.26529/cepsj.679>

- Tung, F. 2016. Child perception of humanoid robot appearance and behavior. *International Journal of Human-Computer Interaction*, 32, 493–502. EBSCOhost.
- Tuomi, Jouni, and Anneli Sarajärvi. 2018. *Laadullinen tutkimus ja sisällönanalyysi*. Uudistettu laitos. Helsinki: Kustannusosakeyhtiö Tammi, 2018.
- Uteli Technologies Ltd. Elias Robot. Accessed May 15, 2023. <https://www.eliasrobot.com>
- Wang, Yi Hsuan, Shelley S.C. Young, and Jyh-Shing Roger Jang. 2010. “Using Tangible Companions for Enhancing Learning English Conversation.” *Educational Technology and Society* 16, no: 2, 296–309. Accessed October 1, 2023. IEEE Xplore.
- Wen-Min Hsieh, Hui-Chin Yeh & Nian-Shing Chen. 2023. “Impact of a robot and tangible object (R&T) integrated learning system on elementary EFL learners’ English pronunciation and willingness to communicate, *Computer Assisted Language Learning*.” Accessed October 1, 2023. Taylor & Francis Online.
- Werquin, Patrick. 2010. “Recognising Non-Formal and Informal Learning: Outcomes, Policies and Practices.” OECD Publishing, 2010. Accessed November 7, 2023. OECD iLibrary.
- Whitby, Blay. 2009. “Artificial intelligence”. The Rosen Publishing Group, Inc.
- Zarrinabadi, Nourollah, Saeed Ketabi, and Mansoor Tavakoli. 2019. “Directed Motivational Currents in L2: Exploring the Effects on Self and Communication.” Cham: Springer International Publishing AG, 2019. Accessed May 20, 2023. Springer.

Appendices

Appendix 1 The composition and basic questions of the interview

Introduction to the interview

The topic of the interview is told to the teacher. The teacher is encouraged to speak rather more than less and ask for clarification if anything seems unclear.

1. Background information

- Educational background
- Teaching experience in years
- The grades and levels in which the teacher has worked in
- Current subject, educational level, and grade in which the teacher works in

2. Experience using Elias robot

- Have you used Elias robot application through a social robot, another device, or both?
- For how long have you used Elias robot in your teaching?
- How often do you use Elias robot with a group on average?
- Why do you use Elias robot?
- In which subject's lessons have you used Elias robot?
- What kind of feedback have you received from the students concerning Elias robot?

3. L2 WTC in classroom and the role of Elias robot

The term L2 WTC is explained to the teacher, together with some examples of how L2 WTC could be seen in the classroom.

- Do you think Elias robot has had an affect on your students L2 WTC?
- Why do you think that is?
- Which characteristics of Elias robot increase L2 WTC?
- Which characteristics of Elias robot decrease L2 WTC?
- In what kind of situations do your students express the most L2 WTC during lessons?
- In what kind of situations do your students express the least L2 WTC during lessons?
- How can the students use the things learned with Elias robot outside classroom?

- Do you think the effects of Elias robot extend to the students' lives outside school?

4. Elias robot in English lessons (asked if the teacher did not use Elias robot for English teaching.)

- Do you think Elias robot could be suitable for teaching English?
- Do you think your previous experiences considering Elias robot could be applied to Elias robot being used for teaching English? Why or why not?

5. Additional comments from the respondent

- Is there anything you would like to add to your previous answers?
- Is there something I forgot to ask that you would like to add?

Appendix 2 Finnish summary

Viime vuosikymmenen aikana teknologian ja robotiikan hyödyntäminen oppimisympäristöissä on herättänyt kiinnostusta ja avannut mahdollisuuksia didaktiikan uudistamiseen. Tämän pro gradu -tutkielman tavoitteena oli selvittää suomalaisen Elias robot -sovelluksen vaikutuksia kielenoppijoiden kommunikaatiohalukkuuteen opettajien näkökulmasta sekä pohtia siihen johtaneita syitä. Lisäksi tutkimus pyrkii arvioimaan Elias robotin mahdollisuuksia lisätä opiskelijoiden kommunikointihalukkuutta englannin kielessä opettajien näkemyksen perusteella. Tutkimuskysymykset olivat seuraavat:

Onko Elias robotin käyttö lisännyt kielenoppijoiden vieraan kielen kommunikaatiohalukkuutta opettajien näkökulmasta?

Mitkä Elias robotin vaikutukset ovat vaikuttaneet positiivisesti kielenoppijoiden vieraskieliseen kommunikaatiohalukkuuteen opettajien näkökulmasta?

Voisiko Elias robot lisätä kielenoppijoiden kommunikaatiohalukkuutta englannin kielessä opettajien arvioiden mukaan?

Tutkielman teoriaosuus koostuu kahdesta eri osiosta. Ensimmäisessä osiossa käsitellään sosiaalisia robotteja ja robottivälineistä kielenoppimista sekä lyhyesti tekoälyä ja ihmisten ja robottien väliset vuorovaikutusta. Ensimmäisen osion toisessa puoliskossa keskitytään nimenomaan tutkimuksen kohteena olevan Elias robotin toiminnan pääperiaatteisiin ja siitä jo saatuun tutkimustietoon. Teoriaosuuden toinen puoli käsittelee pääosin kommunikaatiohalukkuutta sekä siihen liittyen toisen kielen oppimisen peruseriaatteita ja oppijoiden yksilöllisiä eroja.

Sosiaalinen robotti on robottityyppi, joka voi toimia itsenäisesti tai lähes itsenäisesti ja joka on suunniteltu kykenemään kommunikaatioon ihmisten kanssa noudattaen niiden sosiaalisesti hyväksyttäviä normeja (Bartneck ja Forlizzi 2004, 592; Cerrato ja Campbell 2017). Ne ovat fyysesti olemassa olevia robotteja, mikä erottaa ne esimerkiksi näytöille ilmestyvistä robottikuvista, kirjoittavat Ao ja Ju (2022). Monet sosiaalisista roboteista on tehty ulkoisesti muistuttamaan ihmisen kaltaista olentoa. Tung (2016) kirjoittaa, että humanoidirobotit ihmismäisten piirteiden ansiosta oppijoiden on helppo samaistua tällaisiin robotteihin. Tässä tutkimuksessa olin kiinnostunut selvittämään Elias robotin vaikutuksia nimenomaan silloin, kun sitä käytettiin robotin kanssa. Tekstissä mainitaan, että sosiaalisen yhteyden muodostuminen ihmisen ja sosiaalisen robotin välillä vaatii robotin kielellisten, verbaalisten ja visuaalisten ominaisuuksien synkronoitua toimintaa. Tekoäly määritellään kyvyiksi, joiden avulla koneet pyrkivät matkimaan luonnollista älykkyyttä, jota löytyy esimerkiksi ihmisiltä. Robotiikka jaetaan tekstissä kahteen kategoriaan: oppimisen kohteeseen ja oppimisvälineeseen.

Tekstissä viitataan useisiin tutkimuksiin, jotka osoittavat, että sosiaalisilla robooteilla voi olla positiivisia vaikutuksia kieltenoppimiseen, kuten sanaston nopeampi oppiminen (Leeuwestein ym. 2020), tarkempi kieliopin käyttö (Khalifa, Kato & Yamamoto 2019) ja sujuvampi suullinen viestintä (Iio ym 2019). Tekstissä tuodaan esiin, että sosiaaliset robotit voivat tarjota oppijoille positiivisia kielenoppimiskokemuksia, erityisesti virheiden tekemisen kokemuksen ollessa vähemmän nöyryyttävä robottiin verrattuna (Chang & Chen 2010; Wang, Young & Jang 2010). Vaikka monet tutkimustulokset osoittavat robottiaivusteisen kielenoppimisen olevan hyödyllistä, on myös tutkimuksia, joiden mukaan robottiaivusteisuudella ei ole ollut vaikutuksia tai ne ovat olleet negatiivisia (Lee ym. 2011; Hyun ym. 2008). Tekstissä korostetaan, että vaikka sosiaaliset robotit voivat tehostaa oppimista, ne eivät korvaa ihmisopettajia, ja opettajien tulisi nähdä robotit lisämahdollisuuksina pedagogiikassa. Teknologia ja robotiikka kehittyvät jatkuvasti vastaamaan nykyajan ja tulevaisuuden tarpeita, ja robottiaivusteisen kielenoppimisen tarkoituksena on avustaa opettajia, ei korvata näitä.

Elias robot on Utelias Technologies Oy:n sovellus, jota voi käyttää sosiaalisen robotin, Nao V5:n, Nao6:n tai Pepperin välityksellä tai muun elektronisen laitteen, kuten puhelimen tai tabletin kautta (Utelias Technologies Oy). Tässä tutkimuksessa olin kiinnostunut selvittämään Elias robotin vaikutuksia nimenomaan silloin, kun sitä käytettiin robotin kanssa. Kansantajuisesti voisi sanoa, että Elias robot on robotin ohjelmisto ja sosiaalinen humanoidirobotti on sen laitteisto. Elias-robotin teknologia yhdistää tekoälyä, robotiikkaa ja

puheentunnistusta (ibid.). Robotin kanssa käytettävä sovellus keskittyy erityisesti puhutun kielitaidon harjoitteluun ja on tällä hetkellä ainoa robotiikkaan perustuva sovellus, joka on suunniteltu nimenomaan puhutun kielen oppimiseen (ibid.). Sovellus tarjoaa valmiita oppitunteja ja harjoituksia kahdeksalla eri kielellä, joita opettajat voivat käyttää sellaisenaan tai muokata omaan käyttöönsä. Sisältöjen luominen on mahdollista myös täysin itsenäisesti tai ChatGPT:n avulla. Se toimii oppimisvälineenä voi sisältää sekä muodollisen että epämuodollisen oppimisen piirteitä.

Vaikka Elias robot ei korvaa ihmisopettajaa, se voi tuoda oppitunneille elementtejä, joita opettaja yksin ei mahdollisesti voisi tuoda. Honkalampi (2022) haastatteli kahta opettajaa, jotka olivat käyttäneet Elias robottia vieraiden kielten opetuksessa lasten kanssa. Tutkimuksessa löydetty pääteemat olivat, että Elias robot innostaa oppilaita oppimaan ja rohkaisee heitä puhumaan. Opettajat nostivat myös esiin teknisiä vaikeuksia robotin puheentunnistuksessa. Lisäksi Elias-robottia on tutkittu opiskelijan näkökulmasta muissa tutkimuksissa, kuten sen Elias mukauttamista erilaisille oppijoille (Kouri et al. 2020), nuorten oppijoiden kesken tapahtuvaa neuvonantoa Elias robotin kanssa opiskellessa (Honkalampi, Veivo ja Johansson 2022) ja lapsi-robotti-suhteen muodostumista (Peura ja Johansson 2023). Peura ja Johanssonin (2023) tutkimus käsitteli 3. ja 5. luokkalaisten ranskanopiskelijoiden sidettä opetuksessa käytettyyn Elias robottiin. Tutkimuksessa selvisi, että Elias-robotilla oli hybridirooli, sillä sitä ei nähty pelkästään koneena tai ihmisenä, vaan koneena, jolla oli persoonallisuus.

Toisen kielen oppiminen (SLA) on monimutkainen ilmiö, ja jokainen kieltenoppija eroaa oppimisominaisuuksiensa suhteen. Toisen kielen omaksuminen ja oppiminen eroavat toisistaan: omaksuminen tapahtuu sosiaalisen vuorovaikutuksen kautta, kun taas oppiminen on tietoista toimintaa. Yksilölliset erot (IDs) kattavat kielellisen kompetenssin, motivaation, persoonallisuuden, iän, oppimisstrategiat ja oppimistyylit, mitkä yhdessä tekevät jokaisesta kieltenopijasta ainutlaatuisen. MacIntyre (2007, 564) määrittelee kommunikointihalukkuuden "todennäköisyytenä puhua, kun siihen on mahdollisuus". Toisen kielen (L2) kommunikaatiohalukkuudessa kielitaito ja viestintävalmius ovat merkittävämpiä tekijöitä kuin usein ajateltu persoonallisuus. Hyvän kielitaidon ja viestintävalmiuden lisäksi Baker ja MacIntyre (2003, 71) korostavat oppijan oman kielitaitotason käsityksen merkittävää roolia yksilön kommunikaatiohalukkuuteen.

Seuraavaksi tutkielmassa käsiteltiin MacIntyren kehittämää heuristista mallia, joka kuvaa tekijöitä, jotka vaikuttavat yksilön vieraskieliseen kommunikaatiohalukkuuteen. Malli voidaan jakaa pitkäkestoisiin ja tilannesidonnaisiin tekijöihin, jotka edelleen jakautuvat kuuteen kerrokseen, jotka edustavat sosiaalista ja yksilöllistä kontekstia, affektiivis-kognitiivista kontekstia, motivaatiotekijöitä, tilannesidonnaisia edellytyksiä, käyttäytymisaikomuksia ja varsinaista viestintäkäyttäytymistä. Lopuksi tekstissä nostetaan esiin tarve tarkastella tätä mallia uudelleen, ottaen huomioon nykyajan elektroniset laitteet ja robotiikan käyttö toisen kielen oppimisessa. Tutkimuskohde voisi olla, voiko MacIntyren mallia soveltaa tilanteisiin, joissa kommunikaatio ei tapahdu kasvotusten, kuten ihmisen ja robotin välillä.

Tutkimukseen tarvittava tieto kerättiin viideltä opettajalta, jotka olivat käyttäneet Elias robottia omassa opetuksessaan. Utelias Technologies Oy:n yhteyshenkilö auttoi opettajien etsinnässä välittämällä Elias robotia käyttäville opettajille viestin tutkimukseeni liittyen. Tiedonkeruu toteutettiin teemahaastatteluilla, jotka tehtiin Zoomin välityksellä. Jokainen opettaja osallistui haastatteluun yksin, ja vastauksien kestoista riippuen haastattelutilanteet kestivät 20 minuutista 40 minuuttiin. Teemahaastattelua tehdessä haastattelija on suunnitellut haastattelun rungon sekä kysymykset, joita hän kysyy kaikilta haastateltavilta (Dörnyei, 2007, 136). Haastattelutilanteen edetessä haastattelija kuitenkin tyypillisesti kysyy tarkentavia kysymyksiä ja voi pyytää haastateltavaa kertomaan lisää tietyistä teemoista haastattelussa ilmenneiden asioiden pohjalta. Haastattelun alussa jokaista opettajaa pyydettiin kertomaan ensin taustojaan itsestään opettajana ja sitten omia kokemuksia Elias robotin kanssa. Tämän jälkeen heille kerrottiin lisää kommunikaatiohalukkuudesta ja näitä pyydettiin pohtimaan Elias robotin vaikutuksia kommunikaatiohalukkuuteen sekä tulokseen johtaneita syitä. Jos opettaja ei ollut käyttänyt Eliasta englannin opetuksessa, heiltä kysyttiin suoraan arviota sen sopivuudesta englannin kommunikaatiohalukkuuden kasvattajana. Tutkimuksessa valittiin haastatella nimenomaan opettajia, eikä kielenoppijoita, sillä opettajien työnkuva sisältää jatkuvaa oppilaiden, omaa sekä opetusmateriaalin arviointia. Siten he ovat arvioinnin ammattilaisia myös Elias robotin vaikutuksia tutkittaessa. Haastattelut litteroitiin Wordin sanelutyökalua hyödyntäen. Opettajien oikeiden nimien sijasta heistä käytettiin tutkimuksessa nimityksiä Teacher 1, Teacher 2, Teacher 3, Teacher 4 ja Teacher 5. Opettajien erilaiset taustat tuotiin ilmi tekstissä ja erillisessä taulukossa. Heillä oli opettamiskokemusta enintään 20 ja vähintään 5 vuoden ajalta, Eliasta opettajat olivat käyttäneet arvioidensa mukaan

viidestä vuodesta alle vuoteen. He opettivat alakoulussa, ammatillisissa oppilaitoksissa sekä aikuiskoulutuskeskuksessa. Eliasta käytettiin suomen, englannin ja ranskan opettamiseen.

Kun tarkastellaan ensimmäistä ja kolmatta tutkimuskysymystäni, datan analysointi oli varsin yksinkertaista, sillä heiltä oltiin kysyttiin suoraan näkemyksiä Eliaksen vaikutuksista oppilaiden kommunikaatiohalukkuuteen sekä sopivuudesta englannin kielen kommunikaatiohalukkuuden kasvattajana. Nämä kommentit lisättiin suoraan tutkimusmuistiinpanojen ensimmäisen ja kolmannen tutkimuskysymyksen vastuuskategoriaan. Toisen tutkimuskysymyksen osalta opettajien kommentteista pyrittiin etsimään toistuvia teemoja, joiden he olivat kokeneet toimivan kommunikaatiohalukkuutta lisäävinä tekijöinä. Tutkimuksessa esitettiin otteita haastatteluista. Tutkimusmateriaali analysoitiin datavetoisen sisällönanalyysin avulla (Tuomi & Sarajärvi, 2018, 108-113). Käytännössä analyysi eteni siten, että litteroitua materiaalia lukiessa erotettiin osiot, joissa haastateltavat jakoivat kokemuksiaan Eliasin vaikutuksista kommunikaatiohalukkuuteen. Kun nämä kokemukset oli löydetty, ne käännettiin suomesta englanniksi. Seuraavaksi näistä muodostettiin supistettuja ilmaisuja, jotta kokemusten teemoittelu laajempiin ryhmiin olisi mahdollista. Teemoitus eteni kahdessa vaiheessa: aluksi luotiin alaluokkia, ja niiden perusteella muodostettiin sitten laajempia pääluokkia. Analyysin perusteella löydetty teemat toisen tutkimuskysymyksen osalta olivat lisääntynyt motivaatio, emotionaalisesti turvallinen oppimisympäristö ja lähestyttävyyys. Ensimmäisen ja kolmannen tutkimuskysymyksen osalta analyysi sisälsi vain datavetoisen sisällönanalyysin kaksi ensimmäistä vaihetta.

Tutkimuksen tulokset ovat seuraavanlaiset. Ensimmäinen tutkimuskysymys pyrki selvittämään, oliko Elias robotin käytöllä ollut vaikutusta oppilaiden vieraskieliseen kommunikaatiohalukkuuteen opettajien näkökulmasta. Kaikki viisi opettajaa olivat yksimielisiä mahdollisista vaikutuksista: heidän kokemustensa mukaan Elias oli positiivisesti vaikuttanut oppilaiden vieraskieliseen kommunikaatiohalukkuuteen riippumatta oppijoiden iästä tai nykyisestä koulutusasteesta. Eräs opettajista pohti, oliko positiivisten kokemusten taustalla yksin Elias vai esimerkiksi se, että Eliasta käytettiin yleensä pienryhmätyöskentelyssä. Koska tutkimuksia, jotka yhdistävät kommunikaatiohalukkuuden ja robottivasteisen kielenoppimisen, oli vain yksi, vertaaminen aiempiin tutkimuksiin oli haastavaa.

Toisen tutkimuskysymyksen osalta tavoitteena oli löytää mahdollisia selityksiä sille, miksi Elias robotin on koettu lisäävän opiskelijoiden vieraskielistä kommunikaatiohalukkuutta

opettajien näkökulmasta. Datavetoisen sisällönanalyysin perusteella tunnistettiin kolme pääteemaa: lisääntynyt motivaatio, emotionaalisesti turvallinen oppimisympäristö ja lähestyttävyyys. Aiempien tutkimusten perusteella robotin kanssa oppivat opiskelijat ovat kokeneet olevansa motivoituneempia kuin verrokkiryhmät. Vaikka robottivasteisen kielenoppimisen tavoitteena on tukea opettajaa eikä korvata tätä, opettajat vertasivat nopeasti oppilaiden vuorovaikutusta robotin kanssa oppilaan ja opettajan väliseen kommunikaatioon. He kokivat, että aiheesta riippumatta opiskelijat olivat innokkaita kommunikoimaan Eliaksen kanssa heti, kun se tuotiin luokkaan. He kuitenkin raportoivat, että joskus opiskelijat voivat turhautua, koska Eliaksen äänentunnistuksessa on ongelmia, mikä johtaa samojen asioiden toistamiseen useita kertoja. Toiseksi, koska Elias antaa vain positiivista palautetta, opettajat arvioivat, että opiskelijat tuntevat olonsa turvalliseksi Eliaksen kanssa oppiessaan. Heidän mielestään oppilaat ovat hyvin tietoisia Eliaksen olevan vain robotti, joka ei voi tuntea negatiivisia tunteita oppilasta kohtaan. Samanlaisia löydöksiä on tehty aiemmin, ja vaikutuksia on verrattu lemmikin läsnäoloon oppimisen kumppanina. Opettajien mukaan kolmas teema, lähestyttävyyys, tekee opiskelijoista halukkaita puhumaan Eliaksen kanssa. Kuten aiemmin todettiin, opiskelijat tietävät, että sen olevan robotti, mutta he kokevat sen silti helposti lähestyttäväksi, koska sillä on ihmismäisiä piirteitä ja se muistuttaa pienen kokonsa takia lasta. Opettajilla oli kuitenkin erilaisia mielipiteitä robotin kokoon liittyen. Vaikka jotkut ajattelivat, että vahvan auktoriteetin takia olisi hyvä, jos robotti olisi suurempi, useimmat ajattelivat, että robotin pieni koko tekee siitä helposti lähestyttävän eikä pelottavan. Eliaksen luoma tunneturvallisuus arvioitiin ratkaisevan tärkeäksi opiskelijoiden rohkaisemisessa ilmaisemaan itseään pelkäämättä toisen osapuolen negatiivista reaktiota.

Kolmannen tutkimuskysymykseni tarkoituksena oli selvittää, miten opettajat kokevat, että Elias-robotti voisi parantaa myös opiskelijoiden kommunikaatiohalukkuutta englannissa. Opettajat vastasivat empimättä, että Eliaksen vaikutukset eivät liity mihinkään tiettyyn kieleen vaan koskevat kaikkia kieliä, joita voidaan oppia Eliaksen avulla. Robottia pidettiin arvokkaana resurssina eriyttämiseen.

Vaikka tämä tutkimus tarjoaa arvokkaita ja uusia näkökulmia, on tärkeää tunnistaa tietyt rajoitukset. Haastateltavana olleet viisi opettajaa muodostavat melko pienen ryhmän edustamaan kaikkia Eliasta käyttäviä opettajia. Tulevat tutkimukset voisivat hyötyä laajemmasta ja monipuolisemmasta osallistujaryhmästä. Lisäksi oppijoiden omat arviot Elias robotin vaikutuksista näiden kommunikaatiohalukkuteen syventäisivät tässä tutkimuksessa saatuja tietoja.