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REMOTE LEARNING EXPERIENCE AND PERSONALITY TYPES

During COVID-19

International Business
2021

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ABSTRACT

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A large number of educational institutions have been affected by the coronavirus pandemic started in December 2019 in China spreading throughout the world. The virus outbreak constrained universities to close the premises and transfer to distance learning. This influenced students' performance and perception of studies in different ways.

The aim of the thesis is to explore the potential connection between the personality types of students and their remote learning experience, where the personality types are measured with the Myers Briggs Type Indicator tool.

In the introduction of the thesis, the background of the research the research questions and the structure will be presented. The theoretical chapters are built to provide with the necessary theoretical background of the terms utilized in the thesis, which includes the COVID-19 pandemic, distance learning and the MBTI tool, at the end, the existing research on the topic is examined. The empirical study is aimed at answering the research questions defined in the introductory part by collecting data from students of Vaasa University of Applied Sciences with the help of questionnaires, then analyzing it and finally, concluding the results in the last chapter.

As for the results, the research has not confirmed the connection between the personality types of students and their remote learning experience, however, subtle differences between the types have been taken into account and analyzed. Additionally, the sources of these dissimilarities have been suggested.

Keywords Distance learning, Personality types, MBTI, COVID-19

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1 INTRODUCTION

1.1 Background of the study

The worldwide coronavirus pandemic has affected education to a great extent. Students have experienced the shift to remote learning which created various experiences and formed different opinions about learning at a distance. Numerous research projects regarding e-learning and online teaching practices have been done to contribute to the topic, learning how to improve the e-learning experience to withstand the outbreak. This research is aimed to contribute to the common knowledge regarding the topic of education during the hard times of the pandemic that started in December 2019 and still continues nowadays.

In this paper, it is suggested that remote learning perception among students arises from their personality types. If this connection happens to be true, this might help educational institutions better adapt to students depending on their personalities, and thereafter improve their e-learning experiences.

1.2 Research problem, questions, and objectives

The research problem of the study is to identify if there is a connection between students' personality types and their distance learning experience and if there is, find answers to the following research questions:

1. What personality types are more averse to remote studying and what personality types tend to enjoy distance learning?
2. What are the MBTI dimensions that make it harder or easier to study at a distance?
3. Are there personality types that appeared to dislike remote learning at first but adapted to it successfully later in the future?

One of the main objectives of the study is to broaden the knowledge about students' perception of remote education by including a psychological aspect. Furthermore, the results of the study could be used by VAMK and other educational institutions

to do further research and create a better e-learning environment taking into account the individualities of students.

1.3 Research structure

The research consists of five chapters: introduction, theoretical and empirical parts, findings, and conclusion. The introduction presents the background of the paper, as well as the research problem, major research objectives, research structure, and limitations. Theoretical study communicates the main theoretical frameworks which are required for the implementation of the research. The empirical part explains the implementation of the study: what research methodology was used, how the data has been collected, and how the results have been analyzed. The last two parts represent the results and conclude the research.

1.4 Limitations

The study is conducted based on the data collected from the students, who study in Finland, at Vaasa University of Applied Sciences, therefore, the results might not be the same for other educational institutions.

2 THEORETICAL STUDY

2.1 COVID-19 pandemic definition and its impact on students

COVID-19 is an ongoing outbreak of coronavirus that emerged in December 2019 in China and spread throughout the world at a fast pace, bringing millions of deaths. This pandemic has forced the governments around the globe to lock down their countries from visitors, restrict the operations of numerous businesses, prohibit public gatherings, close educational premises, and many more. Nowadays, the hospitals are still flooded with infected people, people are wearing masks in the streets and public places.

The influence of the pandemic is vast, however, the focus of this this paper is to study remote learning and how different students are experiencing it, thus, in this chapter it is crucial to recognize how the pandemic effected educational institutions and their students.

According to the research regarding the impact of COVID-19 on mental health and clinical care in Northern Italy, it was found out that the pandemic seriously affects mental health of people (Fusar-Poli;Brambilla;& Solmi, 2020). As Suzanne Lischer, Netkey Safi1 and Cheryl Dickson describe in their article concerning mental health of students during the outbreak, “The rapid increase in cases of infection, worldwide, has created uncertainty and anxiety about what is going to happen”, which has caused “tremendous level of stress among students”; according to their study, 85% of the undergraduate students have experienced anxiety (Suzanne;Netkey;& Cheryl, 2021). Hence, it is reasonable to conclude that mental health of students has worsen due to the distress that occurred during the coronavirus pandemic.

Regarding the impact of the coronavirus on educational institutions, as it has been previously mentioned, educational premises have been shut down to limit interactions between people, and consequently, educational institutions were necessitated to completely transfer to distance learning. Distance learning, its history and difficulties will be studied in the next chapter.

2.2 Distance learning

2.2.1 Definition and history of distance learning

Distance learning is “education that takes place when a teacher and students are separated by physical distance” (Harting & Erthal, 2005) . Such synonyms as remote studying, distance education will be used in the paper when referring to distance learning.

One of the first forms of remote learning was correspondence education, which suggests transmission of learning materials by mail. In return, completed exercises would be sent back to the teacher by the students. The main goal of correspondence education was to equalize opportunities to learn for everybody (Isman A., 1999). It started in 1728, when the teacher Caleb Phillips bought an advertisement in Boston Gazette proposing delivery of his lesson materials by post in print format on weekly basis (Holmberg, 1995). Thus, correspondence education was implemented in the countries with large distances: USA, Canada, China, Australia and New Zealand. Thereafter, in 1836, a new system of external examination was incorporated at the University of London. Later, in 1856 in Germany, Berlin, correspondence education was implemented by Charles Toussaint and Gustav Langenscheidt for teaching languages (Isman A., 1999). In the late 18th, Chautauqua movement has arisen in the US, which supplied students with home-study courses based on the material from the Chautauqua publishing house and proposed a 4-year program of reading and remote directions from teachers (Harting & Erthal, 2005). From the late 1800’s correspondence educational institutions were established in many developed countries: the University of Chicago and the University of California in the US, University Correspondence College and Metropolitan College in Britain, a small private school in Malmö, Sweden, École Universelle Correspondence in France, Tietomies in Finland and others. From 1940 to 1980 correspondence programs were implemented in other countries such as China, Japan, Mongolia, Malaysia, India, Zambia, Nigeria, and so forth.

Due to the industrial revolution, in the 1920’s telecommunication technologies were incorporated into correspondence studying. This evolutionary period in remote

learning when radio and TV were included into educational system is called one-way communicational period. Thus, radio stations were used to educate people who lived in distant places without schools via radio broadcasts. After that, in 1945, educational television was established and has become one of new methods of learning. In 1957, some educational programs were created by New York University and CBS in the US. Then in 1952, they began using television in educational purposes. In 1961 Japanese universities started using television for studying at distance, and at the same time USSR has launched TV broadcasts, including them into the correspondence learning. In summer 1966 fist TV lessons accompanied by material sent via mail were shown in France, later, a similar approach of providing students with textbooks to complement TV education process was used by the UK and Canada (Isman A., 1999).

It appears that one-way communication significantly improved distance learning experience, however, there were still inconveniences, among which was lack of interaction between the student and the teacher: it can be assumed that students had questions regarding the material. To ask a question and receive a reply with explanations, a student would need to write and send a mail and then wait for a response, which could take a long time. Therefore, the two-way interactive communication has emerged, solving the previously described issue. Teachers and students could communicate in video and audio formats owing to the advent of technologies. In the late 1970's, a computer was first utilized as a method of education, however, the software was nor advanced neither simple enough to be used in educational purposes, and only in 1990's "telecommunications-based education started to realize its potential" (Harting & Erthal, 2005). Audio and video systems became available, students and teachers could communicate faster, and online programs at universities became widely popular. A substantial number of private and public universities provided students with online courses (Mason, 2001). In the late 1990's technologies, such as LMS (learning management systems), LCMS (learning content management systems), virtual classrooms and others have been introduced. Stuff in some companies started online trainings as well (Oakes) Not much time later, in 2005, Traci Sitzman stated that remote learning is as affective as in-class learning, based on a research conducted at the

University of Tulsa, which indicates that by that time technologies have developed significantly and could be compared to traditional learning in classrooms (Sitzmann, 2005).

The pace of development in the field of technologies is rapid, and nowadays advanced technologies help imitate the classroom environment, for example, listening to an online lecture given by a teacher on Zoom, Microsoft Teams or any other platform, with stable internet connection students can raise hands and ask for a clarification without any disruption.

However, having advanced technologies is not enough for e-leaning to be faultless. Therefore, the issues in remote learning will be discussed in the next chapter.

2.2.2 Issues in distance learning

Distance learning has a number of challenges, one of them is lack of interaction between the student and the teacher. In the study, conducted by Belous, Taylor and Breton, it was identified that distance learning is deficient in interaction comparing to face-to-face learning (Boulos, 2005). Likewise, it was stated in Harting and Erthal's article "History of distance learning" that when teaching remotely, the teacher is not able to receive instantaneous reactions from the students (Harting & Erthal, 2005). This issue is present until today: firstly, the teacher can only see the student's face, and not seeing the whole body of a person excludes an opportunity to analyze his/her body language, and therefore, student's reaction assessment by the teacher may be incomplete; secondly, the students may close their cameras attending an online class; last but not least, if a group of students is large, the teacher cannot see everyone's face on the screen, which makes it hard for a teacher to see the overall reaction of the audience.

Another problem that both students and teaches face in remote learning is insufficient computer skills. In the article "Qualitative analysis of undergraduate paramedic students' perceptions of using case-based learning in an online learning environment" the author claims that computer skills and students' interest to learning are correlated (Williams, 2006).

Furthermore, as Sussan and Recascino noted in their article, “technology is expensive”, and therefore, in different countries there is different access to technologies, not every educational institution can afford quality hardware and software for e-learning (Sussan & Recascino, 2013).

Last but not least, it was found out that during e-learning self-efficacy or the student’s belief in his/her capabilities to control his/her own learning and master it, varies among students. Based on the empirical study, young students had higher levels of self-efficacy compared to older students, who also experienced difficulties entering the state of flow, which is characterized by high involvement, deep focus and enjoyment of the studying process (D'Errico, ym., 2018).

2.2.3 Distance learning during the pandemic

Due to the ongoing coronavirus pandemic that started in 2019, many educational institutions were obliged to completely transfer to remote studying, which caused a great extent of stress, and the aforementioned issues have become even more visible and sensible. Fortunately, there are a lot of technologies available for distance education nowadays. As it was concluded in the article that studied existing technologies for remote learning, “There are a wide range of platforms and technologies available to educators, learners, and colleagues worldwide; the power of technology and online tools will keep us learning and collaborating successfully in these challenging times.” (Mukhopadhyay, ym., 2020). Moreover, in the developed countries, owing to all-embracing technologies, educational institutions already had an electronic system in place before the COVID-19 outbreak, therefore, when the pandemic stroke, students and teachers already had required skills to teach and learn at distance.

However, e-learning systems are not ideal, and such issues as lack of interaction between the student and the teacher and lack of self-efficacy are still in place, moreover, it is important to remember that nowadays these issues have been intensified by the pandemic as people around the world have been deprived of social interaction due to the worldwide lockdown. The study on e-learning perception among college students during COVID-19 has identified that students suffer from

psychological distress because of “ineffective e-learning systems and fear of academic year loss” (Hasan & Bao, 2020). According to the results of another study, the transition to remote learning was challenging for educators, which resulted in the increased levels of stress among students (Suzanne;Netkey;& Cheryl, 2021).

With an intention to broaden the knowledge about e-learning, it is suggested to in this paper that various personalities may perceive remote learning in different ways. Before proceeding, it is necessary to learn more about personality types according to Myers Briggs Type Indicator, which will be reviewed in the next chapter.

2.3 Personality types according to MBTI

2.3.1 MBTI history and definition

In 1921, the book named “psychological types”, written by the Swiss psychiatrist Carl Gustav Jung was published. In the book, the author distinguishes two main psychological types: the extraverted and the introverted; these types are subdivided into four functions of consciousness: thinking and feeling; sensation and intuition. The rational or judgmental types are the ones that include thinking or feeling, on the other hand, the irrational or perceiving types signify the presence of sensation or intuition (Jung & Adle, 1971). All the types will be described and explained later in the chapter.

The Myers-Briggs Type Indicator was developed by Isabel Briggs Myers and her mother Katharine Briggs. By developing the MBTI instrument, Myers and Briggs have identified “the basic preferences” on every domain of the personality types, defined by C.G. Jung; and defined the 16 individual personality types “that result from interactions among the preferences”. MBTI is “personality inventory”, it is a tool which makes the psychological types theory presented by C.G. Jung understandable for anyone and applicable in peoples’ lives (Briggs;Mary;Quenk;& Hammer, 2003). The MBTI personality test has proved its validity and reliability, which means the accurate personality profile will be provided as a result of the test (MBTI Basics).

2.3.2 Explanation of the 16 MBTI types

Every psychological type is represented as a combination of 4 letters, the first letter stands for Introversion(I) or Extraversion(E), the second one – Sensing(S) or Intuition(N), the third one – Thinking(T) or Feeling(F), and the last one – Judging(J) and Perceiving(P). Therefore, there are 16 possible combinations, or 16 personality types, which can be found at the top of **Figure 1**. Thus, in order to describe each

type, it is essential to know what preferences and behaviors are represented by each letter.

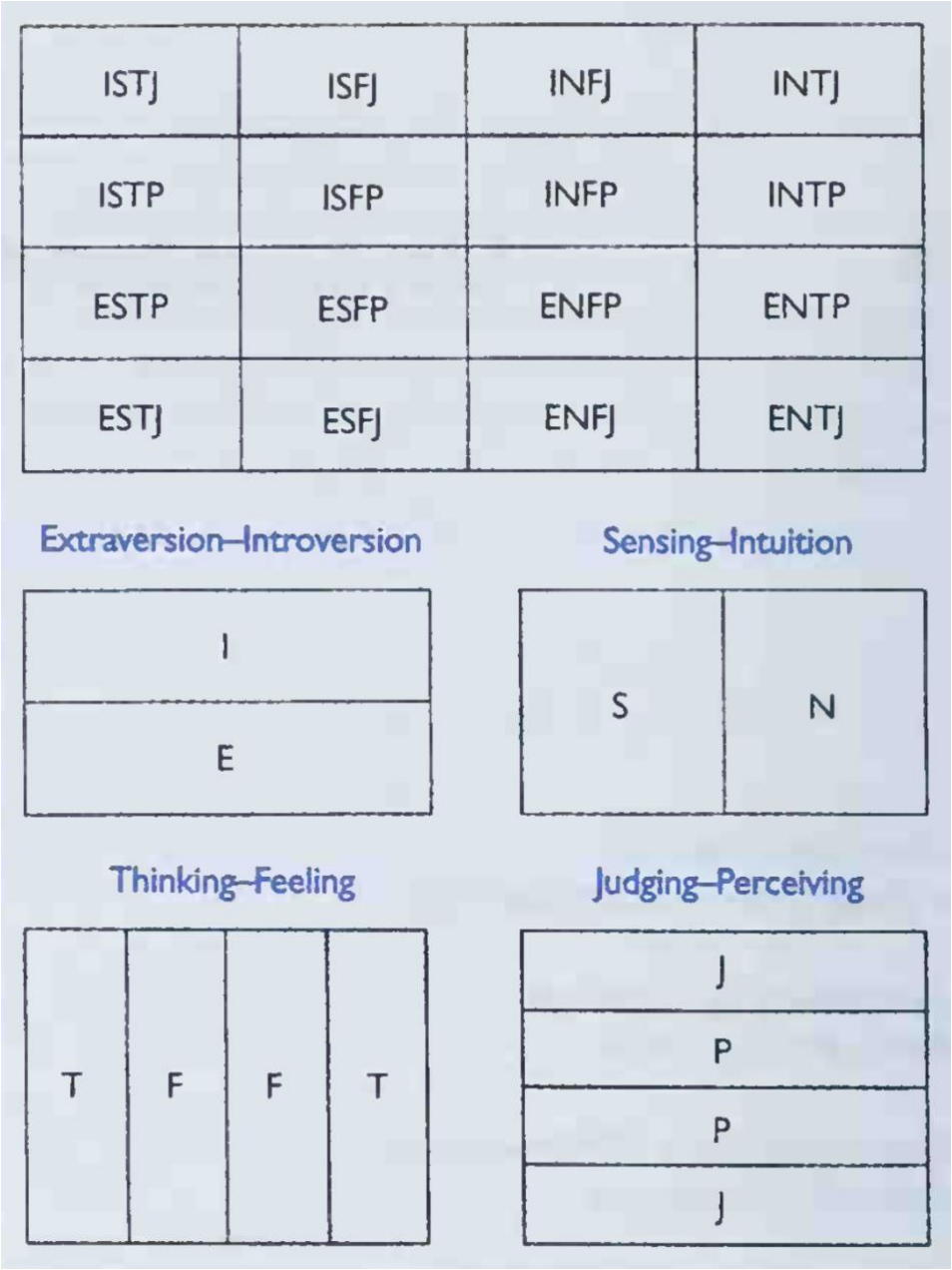

Figure 1. MBTI types structure, source: (Briggs;Mary;Quenk;& Hammer, 2003)

To start with, it is important to remember that MBTI was created based on an interpretation of Jung's theory that was briefly reviewed in the previous subchapter,

and for understanding the MBTI types, it is crucial to gain a more thorough comprehension of the Jung's theory.

Jung theory's initial focus was categorization of people as extraverted and introverted; the two types are represented by the letters E and I in the MBTI. According to Jung's description, the main difference between extroverted and introverted people is their energy orientation. Extraverts' energy is directed outwards, into the external environment full of people and events, whereas introverts tend to direct their energy inwards, into their inner environment, filled with thoughts and experiences (Briggs;Mary;Quenk;& Hammer, 2003). However, Jung admitted that separation of people into extraverts and introverts "does not account for the tremendous differences between individuals in either class", acknowledging that this division is not sufficient (Jung & Adle, 1971).

Subsequently, the four functions related to consciousness were introduced: sensing/intuition (perceiving category) and thinking/feeling (judging category). Starting with the perceiving category, sensing, the letter S in the MBTI, is a function responsible for perception of observations through the five senses: sight, hearing, touch, smell, and taste. Individuals with the dominant sensing function, have a tendency to experience delight and complete involvement in the present moment, they are focused on receiving the best instantaneous experience. In contrast, intuition, symbolized by the letter N in the MBTI, is characterized as the unconscious perception of the future possibilities, the personality with the dominant intuition function often applies abstract-thinking, and is usually future-oriented, imaginative and creative (Briggs;Mary;Quenk;& Hammer, 2003). In relation to learning, sensing and intuition dimensions refer to information gathering. The intuitive types "look for the emerging big picture and future-oriented information", on the other hand, the sensing types collect only "useful practical information to support their work situation" (Russell, 2002).

Moving forward to the judging functions, thinking, the letter T in the MBTI, signifies that the decision-making processes is primarily based on logical connections, thinking function provides with objective impersonal solutions.

Individuals with the dominating thinking function tend to be fair and objective and have analytical minds. As for the feeling function, the letter F, means that the decision-making processes is built around assessment of personal and group values, therefore, the decisions of a person with the prevailing feeling function are usually more subjective, and more focused on feelings and opinions of others rather than technical details of a problem (Briggs;Mary;Quenk;& Hammer, 2003).

Finally, the last letters in MBTI J and P, which mean Judging and Perceiving, were added by Myers and Briggs, derived from Jung's idea of the rational(judging) and irrational(perceiving) types. As it was described earlier, there are two kinds of judgment: thinking and feeling; and two kinds of perception: sensing and intuition. It appears that every person has a tendency to one of these functions. Perception represents "all the ways of becoming aware of people, events, or ideas", embracing the ways of obtaining information, sensations, motivation. The Perception category is characterized by the absence of any limitations put by rational directions, in the flow of sensations or intuitions. Individuals with a tendency for perceiving rather than judging, are often flexible and can adapt fast to new environments. Judgement means "all the ways of coming to conclusions about what has been perceived", which includes the process of evaluation and decision making. The Judgement category refers to the evaluation of perceptions, restricting the flow of sensations

or intuitions. People with a prevailing judging function usually keep the schedule and are highly organized (Briggs;Mary;Quenk;& Hammer, 2003).

In conclusion, the key to the comprehension of the MBTI is being familiar with the meaning of each letter of the type. A visual explanation of all the letters can be found below in **Figure 2**.

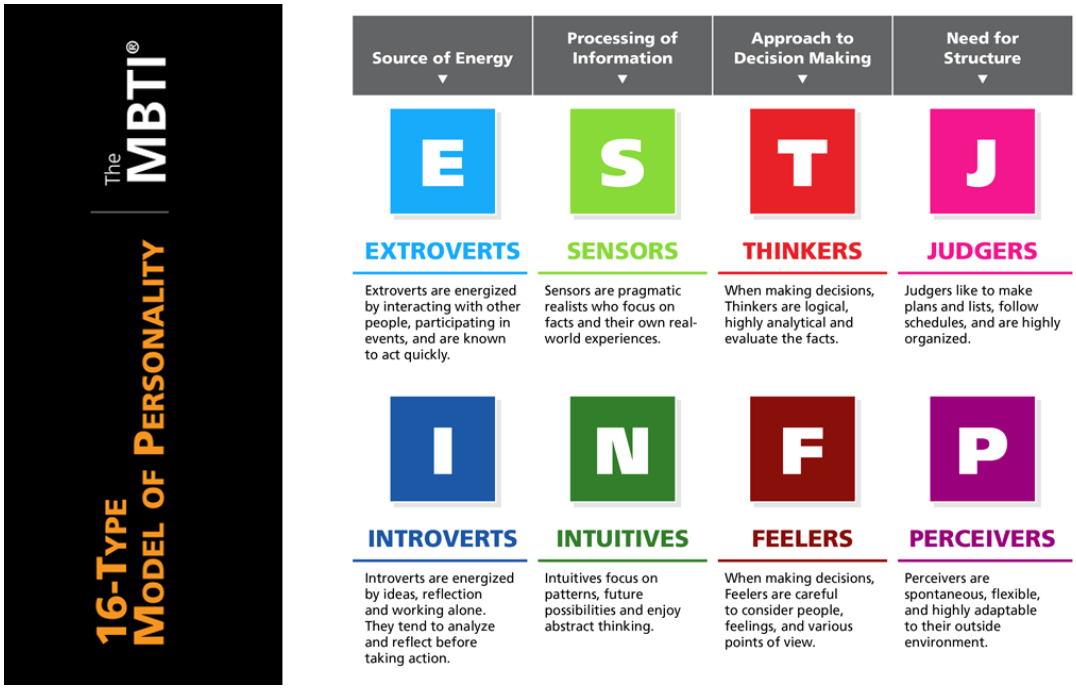

Figure 2. MBTI letters explained, source: (Faust , 2019)

2.4 Existing research about MBTI personality types and distance learning

Before conducting the research, it is essential to explore the existing research concerning MBTI and remote learning relation. Thus, it was discovered in the study by Harrington and Loffredo, who investigated the correlation of preference of online learning and MBTI dimensions among higher-education students, that most Introverts prefer online learning, whereas Extraverts have a tendency to favor a face-to-face learning environment; it was also found that Perceiving types enjoy face-to-face classes more than Judging types. In general, students with a preference for online classes reported strong desire for innovation, while students who

preferred face-to-face learning explained their choice by the fact that the class structure reinforced the learning process by the possibility to listen and observe emotional reactions of their peers and teachers (Harrington & Loffredo, 2010).

One more research, conducted by Russell, presented similar results: Extraverts are inclined to choose face-to-face learning over online education, while Introverts enjoy distance learning due to the need to work unaccompanied to contemplate their thought and ideas and go online when they are ready to share their reflections. It was also realized that students with a dominating thinking function do not usually require face-to-face interaction for making decisions, since they make conclusions through analyzing the task, applying their logic; feeling types are concerned about face-to face interaction, as their decision-making relies on values for people (Russell, 2002).

3 EMPIRICAL STUDY

3.1 Research methodology

There are two research methodologies: qualitative and quantitative. Both approaches are used for gathering data. To choose which methodology is appropriate for a certain study, it is essential to understand the difference between the two, and what type of information is obtained as the result of utilizing each methodology.

To start with, qualitative and quantitative methodologies have different timing. In quantitative research, data is treated as variables, which are prepared in advance, during the planning stage of the research. This preparation stage is separate from gathering and analyzing data. Contrarily, in qualitative research there are no specific limitations for the received data and its format, consequently, "measurement for qualitative researchers occurs during the data collection process". Another difference concerns the type of information obtained during the research. While quantitative research provides explicit numerical data that in the future will be analyzed, explained, and may be converted into more abstract ideas, qualitative research is more flexible and can deliver different forms of data, such as "written or spoken words, actions, sounds, symbols, physical objects, or visual images". The third difference is about linking the concepts and the obtained data. As for quantitative research, before data collection measurement techniques that will link the data to concepts are developed because the data format is clearly defined and limited. In qualitative research, a measurement approach is developed in the process of gathering the data, this required flexibility, and interaction from the researcher (W. Lawrence Neuman & Robson, 2018).

Talking about the advantages and disadvantages of the methodologies, it appears clear that quantitative data is precise and limited and therefore, is easier to analyze the collected data, however, these limitations will not allow participants of the research to fully express themselves. On the other hand, qualitative research requires flexibility from the researcher, as the data is vague and not precise, which complicates the research process, nevertheless, the study participants have an

opportunity to communicate their experience freely, and more information that was not predicted can be obtained and a more complete picture can be received due to the absence of limitations.

To identify what data is required for the study, it is crucial to see what questions are expected to be answered in the research, the questions are the following:

1. What personality types are more averse to remote studying and what personality types tend to enjoy distance learning?
2. What are the MBTI dimensions that make it harder or easier to study at a distance?
3. Are there personality types that appeared to dislike remote learning at first but adapted to it successfully later in the future?

Thus, to conduct the research, it is necessary to have several students who will share information about their personality type and their remote learning experience. Firstly, to answer all the questions, it is necessary to identify the personality types of students, which can be done through the MBTI test, which consists of rank order closed-ended questions, which provides quantitative data: personality type, represented by four letters. The first question can be answered by an ordinal question, where a student assesses how much he/she enjoyed remote learning, hence, the quantitative method will be used again. To answer the second question, it would be more beneficial to receive a thorough response in a form of words: 2-3 sentences from a student that explain the reasons why remote learning is hard or easy, therefore, there is a need for qualitative data for this research as well. Finally, the answer to the third question can be either qualitative or quantitative, so it will be represented as a question with two closed-ended options and an open-ended option where a student can describe his/her experience in case if he/she has a different experience of the perception shift. Consequently, both quantitative and qualitative methodologies will be used in this study, this way all required data in appropriate types will be obtained to answer the research questions.

3.2 Questionnaire building

The questionnaire starts with an introduction that explains the purpose of the survey, what MBTI means and contains a link to the MBTI test, which the respondents will take and provide their personality type in the questionnaire.

The questionnaire includes 5 questions, both closed- and open-ended regarding the student's experience of e-learning at VAMK from the time when the pandemic started until the current moment. The questions are based on research questions listed in the introductory part of the paper. The first question is a closed-ended multiple-choice question, after the respondent has taken the test, he or she is asked to choose his/her personality type out of 16 MBTI types. The second question is a rating ordinal question, where the respondent is expected to evaluate his/her level of enjoyment during the distance learning period. The third question is the clarification of the second one, the student can reflect on the e-learning experience and explain why he/she made the particular choice in question two. The fourth question is about the shift in perception of remote learning, to discover if the experience has improved or not, therefore, this question has three options of answer "Yes", "No" or "Other", the last option is required in case if the respondent has not experienced any shift at all or if the shift was different. Last but not least, the fifth question is optional, it allows the respondents to contemplate the answer to the fourth question and explain their answer.

The questionnaire can be found in the appendices: **Appendix 2** and **Appendix 3**.

3.3 Data collection and analysis

The data was collected online with the aid of the VAMOK student organization by spreading the questionnaires by email to VAMK students. The target for data collection time was two weeks, and the target for the number of respondents reached was 50 students at Vaasa University of Applied Sciences. The results received from the collected data have been analyzed utilizing Excel. The graphs were created and presented for data visualization purposes.

4 FINDINGS

4.1 Questionnaires' results

In this subchapter, the quantitative data will be reviewed. The results will be presented in two subchapters: the overview of the results and results by MBTI dimension. As for the qualitative data, it will be taken into account when interpreting the results in the next subchapter.

4.1.1 Overview of the results

By the end of the data collection period, 51 students had contributed to the research, providing their answers to the questionnaire. The respondents were representatives of various MBTI types, belonging to all types excluding INTP. The 3 most frequent types were ENFJ (8/51), INFP (7/51) and INFJ (5/51), while the least common types which were owned by only one person were ENTP and ESFP. For thorough future analysis, it was essential to split every type into letter-dimensions, therefore, it was recognized how many students of every dimension participated in the survey. Respondents by dimension are displayed below in **Table 1**. From the table, it is evident that among the respondents there are more representatives of the Introverted, Sensing, Feeling and Judging functions and fewer students belonging to Extraverted, Intuitive, Thinking and Perceiving dimensions.

Table 1. Respondents by MBTI dimension.

Dimension	I	E	N	S	F	T	J	P
Respondents no.	29	22	22	29	34	17	30	21
Total respondents no.	51		51		51		51	

To begin with, the first closed-ended question was about the enjoyment of distance learning, and the answers varied significantly among the survey participants. From **Figure 3** it is apparent that 41% of students did not enjoy their experience of remote learning, while 35% were pleased by the e-learning during the pandemic, and the whole of 24% expressed the neutral attitude.

The second question concerned the improvement of the e-learning experience amidst students, the answers to which have shown that most of the students (55%) had experienced the improvement of their remote learning experience, however, 45% claimed that there was no improvement **Figure 4**.

The reasons for the numbers displayed in this chapter will be examined later in the interpretation part, where the qualitative data will be analyzed.

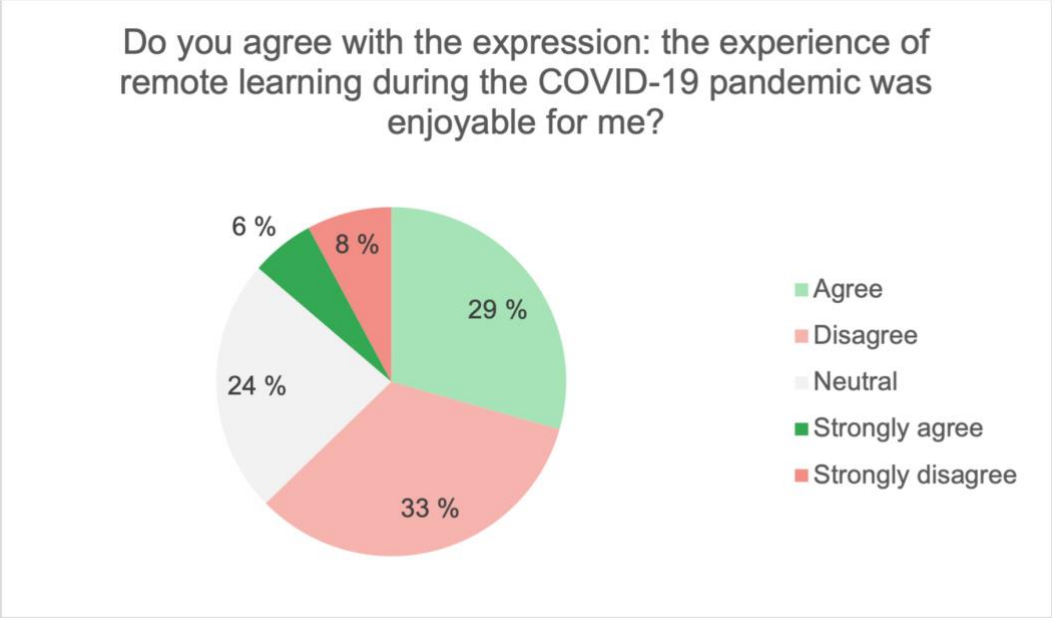

Figure 3. Total remote learning experience during the pandemic.

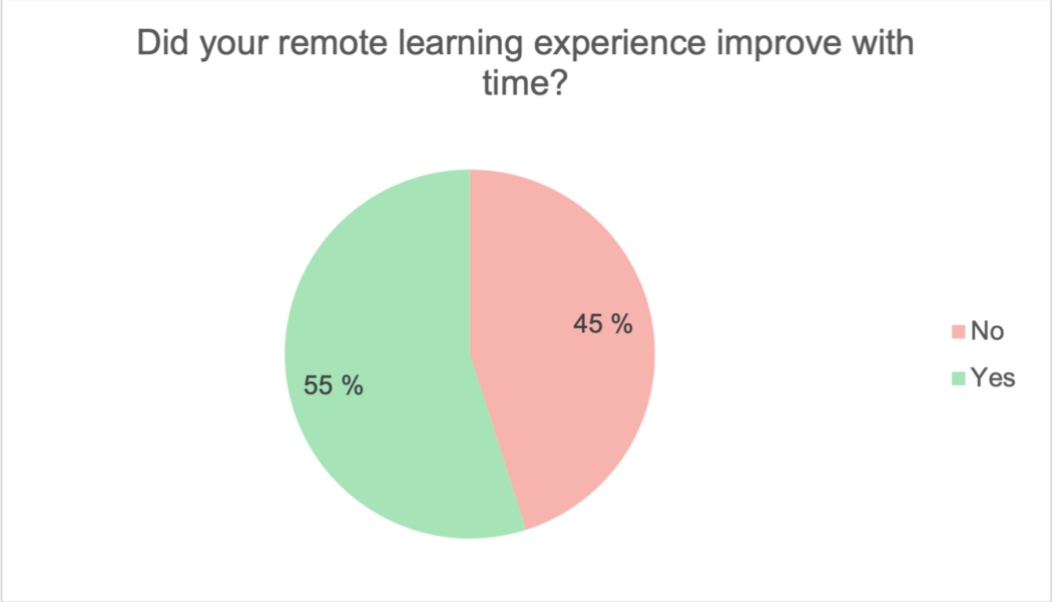

Figure 4. Improvement of the e-learning experience among all respondents.

4.1.2 Results by the MBTI dimensions

Concerning the results, it is appropriate to consider each dimension's answers separately to identify the presence or the absence of the link between the personality types and the e-learning experience. The analysis of the quantitative data will be done and illustrated in this chapter, while the qualitative data will mainly be analyzed in the next subchapter, bearing the quantitative results in mind.

Regarding the structure of this subchapter, each pair of dimensions will be analyzed in isolation: E and I, N and S, F and T, J and P. First, the graphs that illustrate the quantitative data will be presented and commented. At the end of the subchapter, the p-value, aka the probability value, for the first scale ordinal data which represents the students' enjoyment, will be examined for each dimension pair. The p-value will help measure the significance of the statistical hypothesis and will either approve or reject the null hypothesis that signifies that there is no difference between the two MBTI dimensions. If the p-value is less than or equal to 5 %, it is significant, and the null hypothesis is rejected, meaning that the difference between the dimensions is considerable. When the p-value is less than or equal to 10%, it is regarded as marginally significant; if the p-value is higher than 10% it is statistically insignificant and becomes the strong evidence of the null hypothesis, signifying that the difference between the dimensions in the pair is subtle.

To begin with, the first dimensions are extraverted or introverted, the responses to the first question about e-learning experience are shown in **Figure 5** (1). Only 32% of extraverts expressed that they enjoyed their remote learning experience, and the whole of 45% disagreed that the e-learning experience was enjoyable, among which 4% strongly disagreed with the statement.

Regarding students with prevailing introverted function, 38% demonstrated favorable distance learning experience, amidst which 10% strongly agreed that they

enjoyed remote studying, which is more positive compared to extraverts. However, there are still 38% who showed their dissent with the declaration of the remote learning to be enjoyable, among which 10% strongly disagreed, which is altogether less than extraverts **Figure 5** (2).

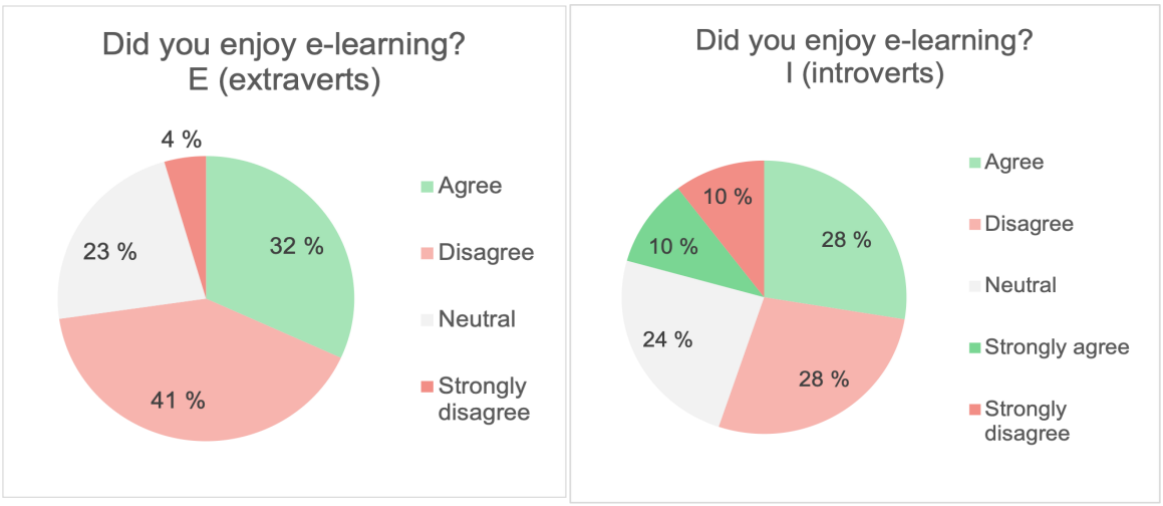

Figure 5. E-learning experience among students with introverted and extraverted functions.

Moving onward, the next two dimensions to be compared are sensing (S) and intuition (N). From **Figure 6** it can be concluded that a total of 46% of individuals with leading sensing function did not enjoy their e-learning experience, 14% of which strongly disagreed that the experience was pleasing; and only 22% expressed that the experience of studying remotely was enjoyable, among which 9% showed the high-level agreement; 32% preferred to stay neutral and neither support nor oppose the statement.

Talking about the dimension opposite to sensing, intuitive, the results of the questionnaire have shown that 45% of intuitive students enjoyed remote learning, which is considerably more than the students with prevailing sensing dimension; and 38% of the individuals with leading intuitive function have also shown their displeasure, which is still less than sensing students. Therefore, students with the main intuitive function have shown a substantially better e-learning experience (23% more).

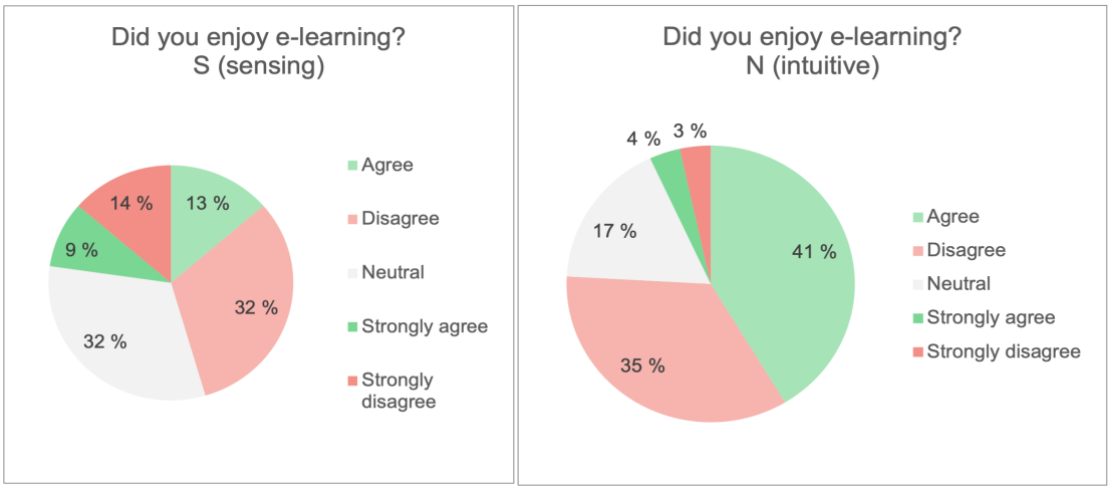

Figure 6. E-learning experience among students with sensing and intuitive functions.

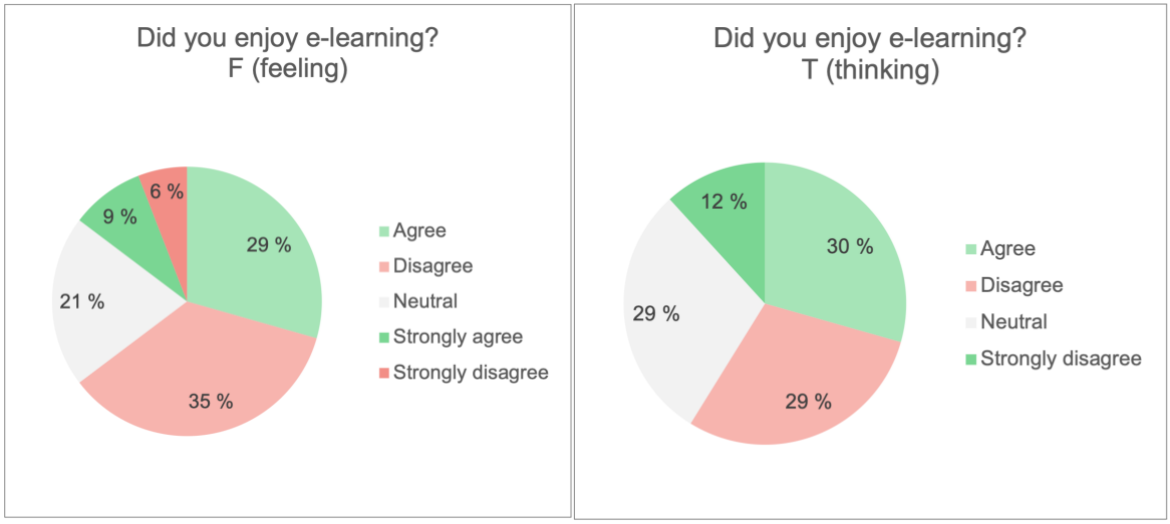

Figure 7. E-learning experience among students with feeling and thinking functions.

The next two dimensions to analyze are feeling (F) and thinking (T). From **Figure 7** it is evident that the number of students with enjoyable e-learning experience is higher among the people with leading thinking function rather than feeling: 42% including 12% who strongly support the statement over 38% among which 9% strongly agrees with the declaration. Comparing the levels of disagreement with the statement in both charts, the percent of the thinking students amounts to 29%, while

among the feeling students, 41% claims that the remote learning experience was not enjoyable, among which 6% strongly contradict the statement. Thus, the students with the prevailing thinking dimension had a more satisfactory e-learning experience comparing to the students with the leading feeling function.

Regarding judging (J) and perceiving (P) functions, as depicted in **Figure 8**, the situations are similar for students of both dimensions: 38 % of perceiving students and 33% of judging students agreed that their experience was enjoyable, while 38% of perceiving students and 44% reported unpleasant experiences.

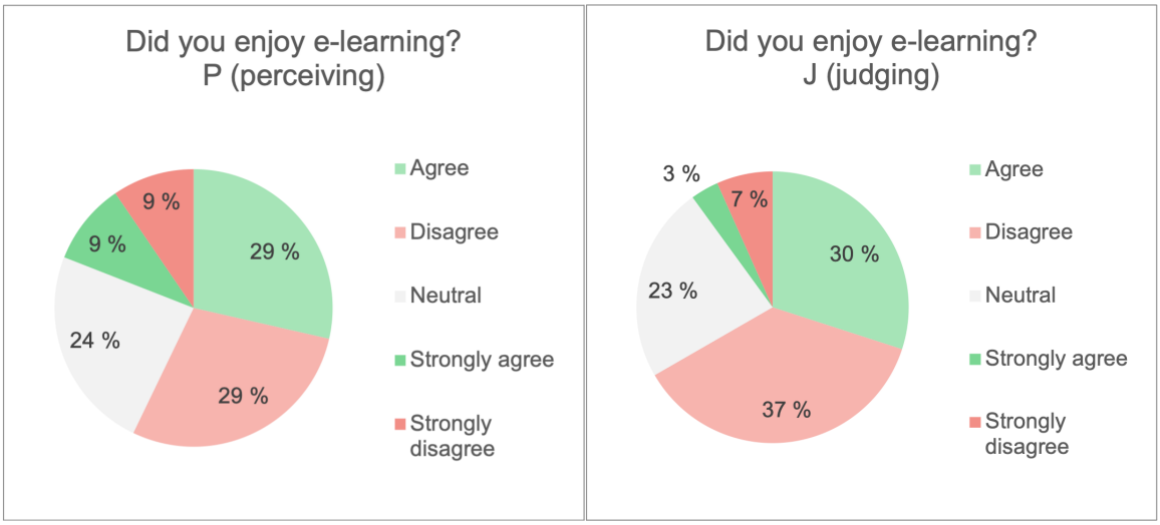

Figure 8. E-learning experience among students with judging and perceiving functions.

As for the second question where the respondents were asked whether their remote experiences have improved, in **Figure 9** the responses of all dimensions are represented and compared. Only the students who either disliked remote learning or stayed neutral answering the question about the overall enjoyment were taken into account when creating these graphs. As for extraverted (E) and introverted (I) students, the majority of introverts and extraverts who did not like remote learning have not had their experience improved: 11 out of 18 introverts and 8 out of 15 extraverts expressed that there was no amelioration. However, more extraverted students still experienced the improvement of their e-learning: 7 students said that the experience was indeed elevated, which is about 47%. Thus, it can be concluded

that while most extraverted and introverted students did not have any improvements in distance learning, the students with the main extraverted dimension experienced a better improvement compared to the introverts, however, this difference is not significant.

Comparing intuitive (N) and sensing (S) functions, it is clear that intuitive students have experienced an improvement: the majority, 9 out of 16, communicated that their experiences have changed for the better. On the other hand, sensing students had the opposite situation, only 5 out of 17 students managed to improve their learning, while a total of 12 out of 17 students disagreed that there was any

amelioration.

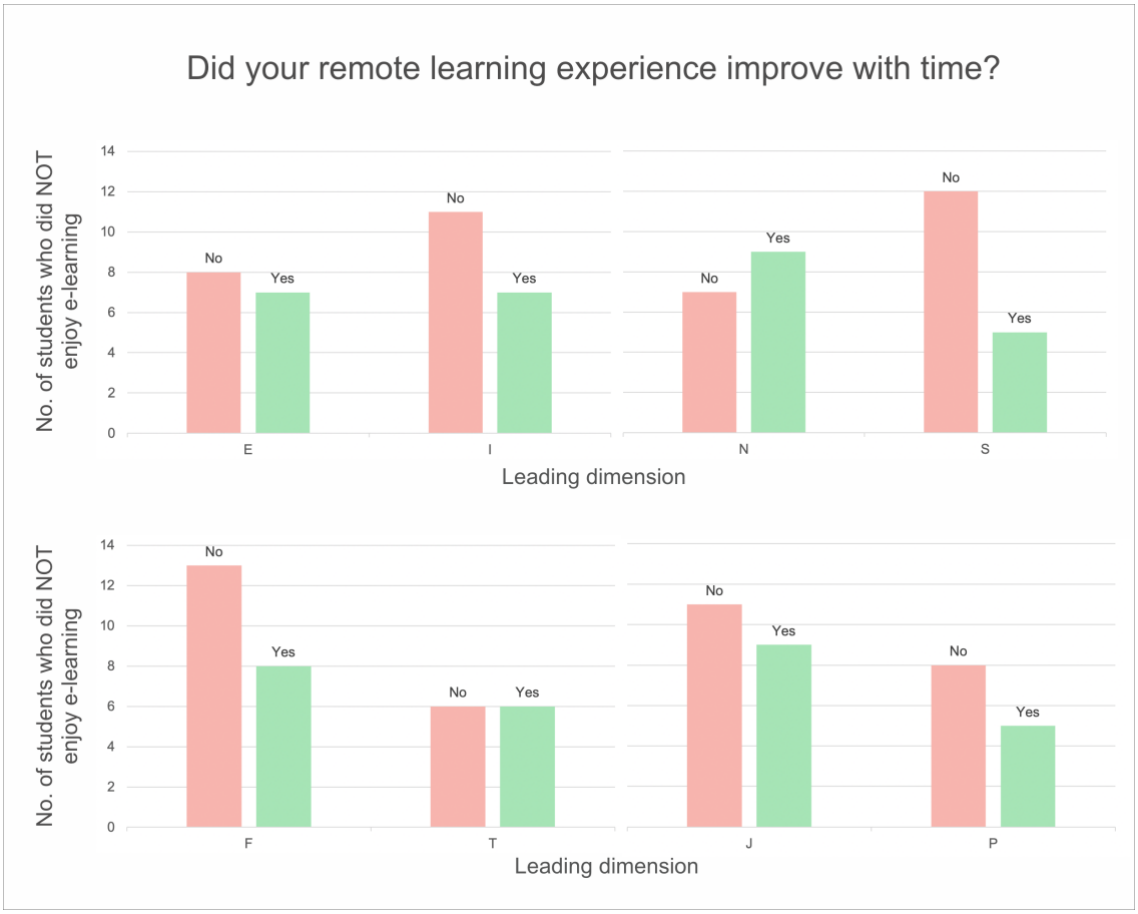

Figure 9. Distance learning experience improvement among the students who did not express enjoyment in the first place.

Therefore, the students with the leading intuitive function have had their experiences improved to a greater extent than the students with prevailing sensing function.

Concerning feeling (F) and thinking (T) functions, a large amount of feeling students, 13 students out of 21, communicated the absence of any amelioration in their remote learning experience. As for the students with leading thinking dimension, 6 students experienced improvement of e-learning and 6 other students did not. Thus, the thinking students had a better improvement of remote learning experience in comparison with the feeling students.

Regarding judging and perceiving students, the situation is similar among both dimensions. 11 out of 20 judging students and 8 out of 13 perceiving students have not experienced positive changes, which is more than half in both cases. Therefore, there is no significant difference detected between the two dimensions.

Taking everything into consideration, it appears that the students with the prevailing introverted, intuitive and thinking functions for the most part tended to have a more enjoyable experience comparing to the individuals with leading extraverted, sensing and feeling functions.

Nonetheless, students of intuitive and thinking dimensions have expressed higher levels of amelioration of their experience than sensing and feeling dimensions. Extraverted and introverted as well as perceiving and judging functions have not shown any notable difference. Not to mention, the most drastic difference was detected between intuitive and feeling dimensions, where intuitive students had a better experience in terms of both, enjoyment and improvement.

The p-value was calculated using the ANOVA tool in MS Excel, it was found out that none of the dimension pairs has a significant difference. One of the dimensions in the pair is the independent variable, i.e., the cause of the satisfaction by the remote learning, whereas the dependent variable is the effect itself, which represents the numerical opinion of the student concerning his or her enjoyment during the remote learning, scaled from 0 to 4. The ANOVA analysis which helps calculate the p-value is presented in **Table 2**, where the p-value is highlighted yellow. In the first pair, **Table 2** (1) E (extraversion) and I (introversion), the p-value is 0.56 or 56%, which is insignificant as it exceeds 10% so the null hypothesis is accepted meaning that the difference between the extraverted students and the introverted students in their remote learning experiences is slight. The same applies to all other dimensions, because the p-value is higher than 10%: 27% for the intuitive and sensing students, 47% for the thinking and feeling and 67% for the judging and perceiving **Table 2** (2, 3, 4). However, comparing all the dimensions it is clear that intuitive and sensing functions have the lowest p-value, which signifies that the contrast between the sensing and intuitive students is greater

compared to the other function pairs. The second diverse is thinking and feeling and the third is extraverted and introverted.

Although the differences according to the p-value are insignificant and subtle, they will still be analyzed and interpreted using the qualitative data in the following chapter.

Table 2. ANOVA analysis, enjoyment by e-learning by dimension. From up to down: 1) Introverts & Extraverts; 2) Intuitive & Sensing; 3) Thinking & Feeling 4) Judging & Perceiving.

SUMMARY

Groups	*Count*	*Sum*	*Average*	*Variance*
Introverts	29	58	2	1,5
Extraverts	22	40	1,818181818	0,822510823

ANOVA

Source of Variation	*SS*	*df*	*MS*	*F*	*P-value*	*F crit*
Between Groups	0,413547237	1	0,413547237	0,341874173	0,561432157	4,038392634
Within Groups	59,27272727	49	1,209647495			
Total	59,68627451	50				

SUMMARY

Groups	*Count*	*Sum*	*Average*	*Variance*
Intuitive	29	60	2,068965517	1,066502463
Sensing	22	38	1,727272727	1,350649351

ANOVA

Source of Variation	*SS*	*df*	*MS*	*F*	*P-value*	*F crit*
Between Groups	1,460569181	1	1,460569181	1,229145949	0,272985259	4,038392634
Within Groups	58,22570533	49	1,188279701			
Total	59,68627451	50				

SUMMARY

Groups	*Count*	*Sum*	*Average*	*Variance*
Thinking	17	30	1,764705882	1,066176471
Feeling	34	68	2	1,272727273

ANOVA

Source of Variation	*SS*	*df*	*MS*	*F*	*P-value*	*F crit*
Between Groups	0,62745098	1	0,62745098	0,520584329	0,474021452	4,038392634
Within Groups	59,05882353	49	1,205282113			
Total	59,68627451	50				

SUMMARY

Groups	*Count*	*Sum*	*Average*	*Variance*
Judging	30	56	1,866666667	1,085057471
Perceiving	21	42	2	1,4

ANOVA

Source of Variation	*SS*	*df*	*MS*	*F*	*P-value*	*F crit*
Between Groups	0,219607843	1	0,219607843	0,180954893	0,672416397	4,038392634
Within Groups	59,46666667	49	1,213605442			
Total	59,68627451	50				

4.2 Interpretation of the results

The goal of this subchapter is to find the explanations to the results withdrawn from the analysis of the quantitative data by examining the qualitative data, i.e., the answers of the students to open-ended questions where they had an opportunity to reflect on their responses to the closed-ended questions.

By measuring the p-value, it was discovered that none of the dimensions had a significant difference within the function pair, however, intuitive and sensing dimensions showed the greatest difference, whereas judging and perceiving - the least. This should be kept in mind when analyzing the data and drawing conclusions.

The main questions for this part are the following:

1. Why did intuitive, thinking and introverted students have slightly more enjoyable experience?
2. Why have intuitive and thinking students had their experience improved?

To start with, analyzing the explanations to the first question answer, why the experience was or was not enjoyable, in general, there are the following positive and negative explanations among the students which usually repeat from student to student. For a general overview, negative and positive comments of the students are presented below.

Positive about the e-learning experience from the most frequently mentioned to the least:

1. E-learning provides with flexibility, it's better to make your own schedule, which may include a part-time job, looking for a job, visiting family and other duties and daily activities. (16 mentions)
2. There is no need to go to the university premises, which is a good advantage due to saving time walking or driving in traffic or avoiding bad weather. (7 mentions)
3. It's more comfortable to be at home. (7 mentions)

4. “I managed to adapt to remote learning”. (5 mentions)
5. It’s more enjoyable to study by yourself at your own pace. (4 mentions)
6. There is no need to communicate with anyone face to face. (2 mentions)
7. E-learning has brought an opportunity to learn something new from new technologies to time management. (2 mentions)
8. There is no need to get ready for school, i.e., dressing up, putting make-up. (2 mentions)
9. E-learning preserves us from getting infected during the pandemic. (2 mentions)

Negative about the e-learning experience from the most frequently mentioned to the least:

1. There is a lack of contact with friends and other people, there are no events anymore. (18 mentions)
2. It's hard to focus on studying and manage time. (12 mentions)
3. E-learning is not effective due to a lack of interaction. (11 mentions)
4. E-learning is boring, which led to the loss of motivation/interest. (3 mentions)
5. It's hard to do group works remotely. (3 mentions)
6. “I don't like to stay at home all the time”. (2 mentions)
7. “I am not satisfied with how the school handled remote learning”. (2 mentions)
8. Learning became harder. (1 mention)
9. “I miss getting ready and putting on a nice outfit” (1 mention)
10. “I need the pressure of real-life to push me to speak out my ideas rather than hiding behind my computer screen”. (1 mention)

4.2.1 Why did intuitive, thinking and introverted students have slightly more enjoyable experiences?

Regarding intuitive and sensing students, whose difference was the most significant among all other dimension pairs, comparing the positive statements inside the dimension pair, the opinion about flexibility and ability to multitask, managing to

do more in a day is the most popular opinion among both sensing and intuitive students:

“I like that I can decide when I want to study and furthermore.” -INTJ

“[Distance learning] makes planning life and school easier.” -INFP

“I can have work-study balance since I'm working part-time from home…I could visit my family and still make sure my studies are progressing.” -INFJ

“I am working at the same time, and remote learning allows me to study more flexibly and efficiently.” -ENTJ

“…remote learning gave me more time to do more things for myself like cooking, exercising. Remote learning also helped me how to manage my study time efficiently.” -ENFJ

“Study virtually is flexible for me…” -ESTP

“Remote learning has given me more opportunities and time to work on other good things apart from school's work. I also have more time for my own.” -ISFP

However, the comments against distance learning have shown that the most common one among students with the main sensing dimension is the fact that it is hard to focus and maintain work-life balance, while the most frequent negative reason among intuitive students is ineffective learning due to a lack of interaction.

“Remote learning … wasn't enjoyable, because I think that I work better other environments than home and I can't focus as well as studying somewhere else.” -ISFJ

“It's much harder to concentrate on the studies from the comfort of your home where you have so many distractions all the time. It's also sometimes hard to separate school time and free time from each other.” -ISTP

“I feel that I didn't learn as much as I would have in class. It was hard to be concentrated.” -ISFP

“Because I have to stay at home a lot, and there are many distractions when you’re studying at home that prevents you from concentrating on the lectures.” -ISTJ

“I focus more when at school...” -ESFJ

“I need to study in the classroom and be able physically to go to school and work with other students to keep me motivated.” -ENFJ

“For more difficult courses, I still think it would be better to have real-life teaching as these courses often contain extensive knowledge, which requires both teachers and students a continuously asking-questions process to embrace the knowledge better.” -INFP

“I have a hard time focusing and finding motivation in my apartment staring at a computer. Going to class, being around people, seeing everything physically and changing up the environment is more preferred.” -ENFJ

“However, the negative impact mentally came from not being able to see friends and discuss things in real life.” -INFP

Therefore, it can be supposed that it is harder for students with prevailing sensing function to be organized and keep daily schedule than for intuitive students, consequently, it is more difficult to be focused on studies, not be distracted and maintain sufficient work-life balance for the sensing students, which has led to lower enjoyment levels. This could be explained by the orientation moment of individuals with the main sensing function at the present moment, so that it is hard to keep the focus on an online lecture, while there are a lot of distractions at home, which could bring a short-term enjoyment right now, at this moment. In contrast, individuals with the leading intuitive function tend to be future-oriented, which helps them with organization and focus. Thus, it can be suggested that due to better organizational skills and the ability to stay motivated because of the orientation on the future, the majority of intuitive students had a better remote learning experience.

Analyzing the comments in regard to the feeling and thinking dimensions, the most frequent comment among students with leading feeling function is lack of face-to-

face interaction, not to mention, only the feeling students noticed that group works are harder to perform remotely.

“Also, it’s better to work in group projects when you can meet in person!” -ENFJ

“Because even during the Zoom meetings, some people are really shy that they rarely speak during the whole meeting or we don't know if they still put attention on the meeting, which makes the meeting ineffective.” -INFP

“Sometimes it’s better to learn things face-to-face. For example, the group works.” -ENFJ

Because individuals with main feeling dimension tend to make their decisions based on values, the ones of themselves and of the people around, distance learning makes it harder to realize other students’ behaviors and needs, consequently, thus, it is more difficult for the feeling individuals to make decisions since the other peoples’ values are too vague to understand. In contrast, the thinking students base their decisions on rational analysis, and they do not need other people’s opinions as much as students with the feeling function. Therefore, since the students with the thinking function do not depend on other people in their decision-making process, they had a better overall experience comparing to the feeling students.

Comparing students of extraverted and introverted dimensions, introverts found some points which were not mentioned by extraverts. To start with, several people with leading introverted function expressed that they prefer studying on their own. Several statements written by introverts are listed below:

“I enjoy doing schoolwork/tasks by myself. Even though some of the courses are tedious during remote learning.” -ISFJ

“In some classes, I preferred to read the learning materials and complete the homework completely by myself.” -INFP

“I learn better at home at my own pace.” -ISTJ

“The learning structure of online-school worked really well for me as I like to learn at my own pace.” -INFP

Another positive opinion about e-learning that was expressed only by introverts is the absence of face-to-face communication:

“The remote learning put less pressure on me in communicating with the teacher and my classmates, thus sometimes it made me feel easier.” -INFP

“I enjoy spending time on my own and I like the fact that I don´t have to socialize so much with people.” -INFP

In contrast, extraverts prefer classroom environment and communication for the reason of receiving interaction:

“I need to study in the classroom and be able physically to go to school and work with other students to keep me motivated.” -ENFJ

“Sometimes I prefer going to school to learn and interact with teachers and friends” -ENFJ

“[The negative aspect of remote learning is] loss of face-to-face contact teaching as well as physical interaction with colleagues where you can freely express yourself with a physical presence.” -ESFJ

“It’s better to work in group projects when you can meet in person!” -ENFJ

“I prefer to go to school, discuss and communicate with others.” -ESTP

“I love contact teaching because we can interact together.” -ENTP

It is important to mention that the preference of contact learning is also popular among introverted students, however, it is more connected with the ineffectiveness of remote learning rather than the need for interaction. Some statements of introverted students who support traditional learning can be found below:

“Remote learning during the COVID-19 pandemic wasn't enjoyable, because I think that I work better other environments than home and I can't focus as well as studying somewhere else.” -ISFJ

“I feel that I didn't learn as much as I would have in class. It was hard to be concentrated.” -ISFP

“For more difficult courses, I still think it would be better to have real-life teaching as these courses often contain extensive knowledge, which requires both teachers and students a continuously asking-questions process to embrace the knowledge better.” -INFP

“I haven't liked the remote learning at all as I don´t learn as much as during contact teaching in the classroom. Contact teaching is easier for me and more effective.” -ISFJ

Moreover, both introverts and extraverts communicated the lack of interaction as a disadvantage, however, for extraverted students, it was the most frequent comment, mentioned a lot of times from person to person, while for introverts it was not as frequent, it was rather mentioned among other reasons for disliking remote studies. Several quotes of extraverts and introverts are listed below (also, some of the extraverted students’ comments concerning the lack of interaction were listed above in the part about the preference of contact learning):

“I miss seeing friends and other people at school.” -ESFJ

“…I also really miss seeing and talking to my classmates that I don’t hang around during my free time.” -ENFJ

“Remote learning is okay but seeing friends has decreased.” -ESFJ

“…It is also important to me see other people, even I wouldn't talk to them.” -ISFJ

“I miss seeing people face to face...” -INFP

Since it was discovered that introverts had a slighter better e-learning experience than extraverts, it can be assumed that this is caused by the fact that introverts found more positive aspects in distance learning, which, in turn, are connected with directing personal energy inwards preferring being alone, studying on their own. On the other hand, extraverts who direct their energy outwards into the outer environment, reported a lack of communication and preference for contact teaching more than introverted students.

4.2.2 Why have intuitive and thinking students had their experiences improved?

Analyzing the answers to the last question, where the respondents could choose to explain the reasons for any possible changes of perception that took place with time during their remote learning, there are various reasons which repeat over and over among the students. Common negative reasons, leading to the unchanged negative experience or even a worsened experience, are listed below:

1. Loss of motivation or fluctuation of motivation levels. (7 mentions)
2. Feeling exhausted studying remotely. (4 mentions)
3. Lack of interaction, including difficulties in group works. (5 mentions)
4. Problems with concentration. (3 mentions)
5. Technical difficulties. (2 mentions)
6. Absence of strict control leading to skipping lessons. (2 mentions)
7. The tiredness of being at home. (2 mentions)

As for the common positive factors leading to the improvement of the experience, they are the following:

1. Finding the motivation to solve problems arising during remote learning. (8 mentions)
2. Getting used to self-management and planning. (6 mentions)
3. The improvement of methods used by the teacher during classes. (4 mentions)
4. The desire to be independent and in control. (3 mentions)

5. The wish to learn new technologies that are used during e-learning. (1 mention)

To start with, it was discovered that intuitive students had better improvement levels comparing to sensing students. After the analysis of the intuitive students' answers, it is clear that the most common factors of improvement are getting used to self-management and planning, finding the motivation to solve problems and the desire to be independent. The last factor was mentioned only by the students with the leading intuitive dimension. Several comments are presented below:

"I feel more independent when I study remotely." -INFJ

"During remote learning, I have more freedom to self-control and self-monitor my own progress." -ENTJ

"I knew why I did find it difficult in the beginning and found ways to fix it." -INFJ

"In the beginning of remote learning, I did not know how to plan time but as it progresses, the time management improved. It is about getting used to the schedule and having some self-discipline." -ENFJ

"At first it was more difficult, but after a while you start to realize how to work more efficiently and take most of the time you have." -ENTJ

As for the sensing students, most of those students who have managed to improve their experiences wrote that they have found their own ways to solve problems and thus got accustomed to remote learning.

"I have found ways to quickly elaborate on information and cooperate with other students to quicker and more effectively deal with assignments." -ISFP

"I have to adapt to remote learning whether I want or not, and I start to see more benefits of remote learning so I can say that it improves with time." -ISTP

"I have created some kind of schedule for myself so that helps my learning." -ISFJ

Examining the negative reasons among intuitive and sensing students which halted the improvement of the remote learning experience, the reasons vary. The most frequent negative factor for the intuitive students is lack of interaction, the second and third common are a lack of motivation and feeling exhausted, while the sensing students emphasized the loss of motivation, problems with concentration and lack of strict control. The last two factors were only mentioned by the sensing students:

“It feels easier and easier to skip lessons when the teacher usually doesn’t even notice if you're there or not.” -ISTP

“Leaning remote is not strict about time and teacher might take it easy so I don't think my experience has improved.” -ISTP

“I sometimes think I could manage my time well, but I usually procrastinate.” -ISFP

“At first, it was easy to concentrate and keep up but now the motivation is starting to slip.” -ISTP

“I think last spring when remote learning was new, and I thought it will be only a couple of months I was more focused and attended all classes. Now I might skip classes many times a week because I am just so tired of it and have no interest in even trying.” -ESFJ

Consequently, it can be supposed that due to the tendency of an individual with sensing function to focus on the present moment, the lack of future orientation fosters the difficulty to focus on schoolwork outside the university environment with its strict control. On the other hand, the intuitive students did not report any problems about the loss of focus or lack of control, supposedly, because of their future orientation, instead, they expressed the desire to be independent and manage their time by themselves.

Finally, the graph showed that the students of thinking dimension had better improvement levels than the ones with leading feeling function. It can be assumed that this is due to the fact that the feeling students need face-to-face communication

for a high-quality interaction since individuals with main feeling function base their decisions not only on logical relations but mainly on the principles of their own as well as of other people's. Not seeing classmates and teachers face-to-face hinders the analysis of the people who the feeling student is working with and makes it difficult to understand the others and therefore, study efficiently. Only the feeling students expressed the difficulty of working in groups, thus, below are listed some explanations of the feeling students regarding this issue.

"[I am experiencing] difficulties in group-work in class...in some of the break-out rooms…some of the members didn't speak during the whole discussion and it was really awkward at the beginning since nobody said anything." -INFP

"During online learning, I know some people turn off cameras and didn't pay attention to the class at all for this reason." -INFP

"Learning online can be good for some people but in my opinion, there is something priceless about having class at school. It gives the opportunity for greater learning, community, and friendships." -INFP

5 CONCLUSION

In conclusion, based on the research conducted at Vaasa University of Applied Sciences, in which 51 students have shared their experiences of e-learning during the coronavirus period that started in December 2019 and led to the closing of educational premises transferring to remote learning from spring 2020 and until today, the connection between the personality types and the perception of the remote learning was not confirmed. During the analysis of the quantitative data, it was discovered that the differences between students of various personality types are subtle, however, these insignificant differences were taken into account and the conclusions listed below have been withdrawn through the analysis of the qualitative data.

Firstly, it was realized that students with prevailing intuitive (N) function had a bit better experience in terms of enjoyment and improvement of it with time and adaptation. Moreover, this dimension pair appeared to have the most considerable difference compared to all other pairs. In fact, intuitive individuals are known by their future orientation, which helps with self-management and planning. Thus, the majority of intuitive students managed to adapt to remote learning thanks to their tendency of looking forward into the future, in some cases, they found ways to manage their time even more efficiently than before the pandemic. As for the sensing (S) students, they tend to concentrate on the present moment, therefore, they had difficulties with keeping the focus on studying while being at home where are a lot of distractions.

Secondly, the results showed that the e-learning experience of the students with the main thinking (T) function happened to be a little more pleasurable and improved with time, comparing to the students with the leading feeling (F) dimension. The issue is that thinking students' decision-making process is founded on logical reasoning and does not require other people's presence, while the feeling individuals need other people to make decisions, because they are concerned about other people's principles, values and opinions, thus, the absence of the face-to-face

interaction is an obstacle for the students with prevailing feeling function, especially when they need to work remotely in a group.

Thirdly, it was found out that students with the leading introverted (I) dimension had somewhat higher levels of enjoyment comparing to the extraverted (E) students. This can be explained by introverts' inclination of directing their energy inwards rather than outwards, which is reflected in such preferences as being alone, staying away from people, studying individually. Remote learning provides the possibility of working by oneself, which is favorable for introverted students. On the flip side, extraverts are inclined to point their energy into the outer world, which makes it harder to study distantly, not seeing peers, working alone.

Last but not least, based on the results, it appears that judging (J) and perceiving (P) functions do not have effect on the student's perception of the remote learning.

All in all, the connection between the remote learning experience and the personality type of the students has not been proved, however subtle differences have been discovered and their causes have been suggested above.

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APPENDICES

Anova: Single Factor: E&I

SUMMARY

Groups	*Count*	*Sum*	*Average*	*Variance*
Introverts	29	58	2	1,5
Extraverts	22	40	1,818181818	0,822510823

ANOVA

Source of Variation	*SS*	*df*	*MS*	*F*	*P-value*	*F crit*
Between Groups	0,413547237	1	0,413547237	0,341874173	0,561432157	4,038392634
Within Groups	59,27272727	49	1,209647495			
Total	59,68627451	50				

Anova: Single Factor: N&S

SUMMARY

Groups	*Count*	*Sum*	*Average*	*Variance*
Intuitive	29	60	2,068965517	1,066502463
Sensing	22	38	1,727272727	1,350649351

ANOVA

Source of Variation	*SS*	*df*	*MS*	*F*	*P-value*	*F crit*
Between Groups	1,460569181	1	1,460569181	1,229145949	0,272985259	4,038392634
Within Groups	58,22570533	49	1,188279701			
Total	59,68627451	50				

Anova: Single Factor: T&F

SUMMARY

Groups	*Count*	*Sum*	*Average*	*Variance*
Thinking	17	30	1,764705882	1,066176471
Feeling	34	68	2	1,272727273

ANOVA

Source of Variation	*SS*	*df*	*MS*	*F*	*P-value*	*F crit*
Between Groups	0,62745098	1	0,62745098	0,520584329	0,474021452	4,038392634
Within Groups	59,05882353	49	1,205282113			
Total	59,68627451	50				

Anova: Single Factor: J&P

SUMMARY

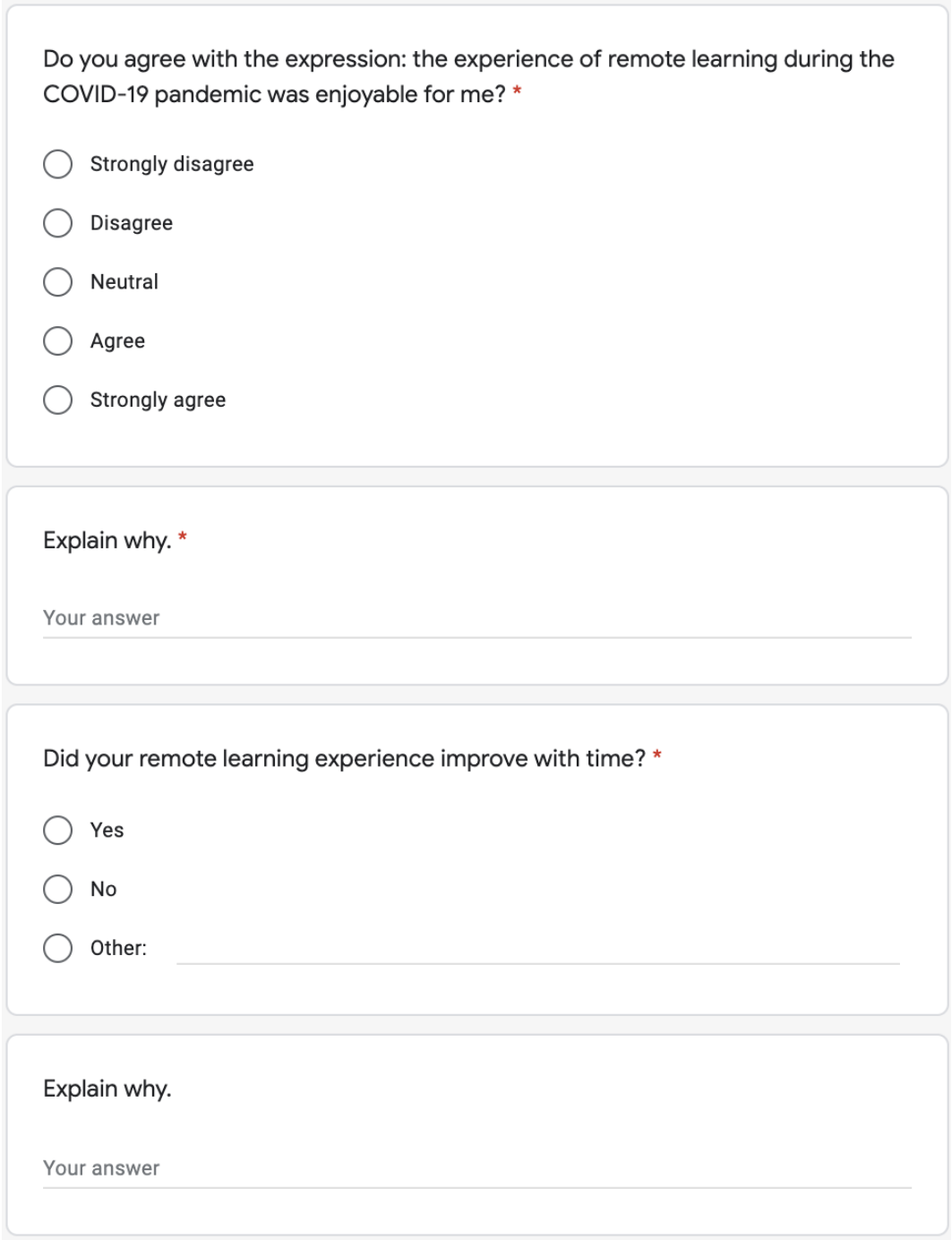
Groups	*Count*	*Sum*	*Average*	*Variance*
Judging	30	56	1,866666667	1,085057471
Perceiving	21	42	2	1,4

ANOVA

Source of Variation	*SS*	*df*	*MS*	*F*	*P-value*	*F crit*
Between Groups	0,219607843	1	0,219607843	0,180954893	0,672416397	4,038392634
Within Groups	59,46666667	49	1,213605442			
Total	59,68627451	50				

Appendix 1. ANOVA Single factor analysis of students' enjoyment by MBTI dimension

Appendix 2. Questionnaire - question 1.



Appendix 3. Questionnaire - questions 2-5.