

ERASMUS UNIVERSITY ROTTERDAM
Erasmus School of Economics

Master Thesis Accounting & Auditing

Distance learning vs. traditional learning for accounting students after the COVID-19 pandemic: In Secondary Vocational Education (MBO in the Netherlands)

Abstract

The main objective of this study is to examine the difference in the effectiveness of distance learning (DL) vs traditional learning (TL), but also the perspective of the students in secondary/ intermediate vocational education in the Netherlands (MBO). To study this, three groups of students following the same classes for the same period, by the same teacher are included in this research. The only difference is whether they had DL or TL classes before taking their exams.

The results show that there is no significant difference in the improvement of the results, between groups that had DL vs TL. Even though DL has its advantages, our findings suggest that TL continues to hold a preference, particularly for practical courses.

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The content of this thesis is the sole responsibility of the author and does not reflect the view of either the supervisor, second assessor, Erasmus School of Economics, or Erasmus University.

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1. Introduction and motivation

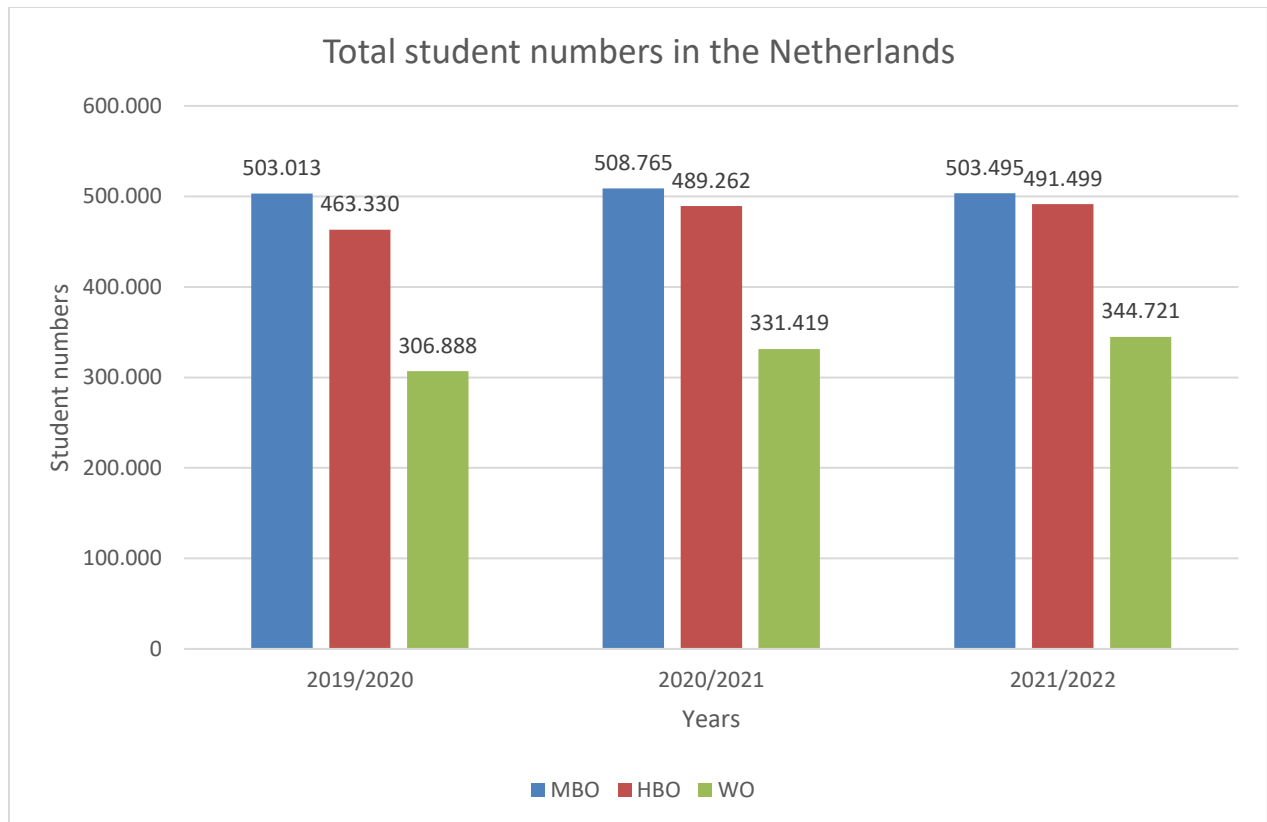
The coronavirus (Covid-19) pandemic represented a global health crisis, it was even considered to be the greatest challenge since World War II. Its effects were global and crossed all industries, according to the World Health Organization (WHO, 2022).

Even though this pandemic seems in the past, its effects will require years to recover. As it has strained the resources of all countries and thereby affects not only the health industry but influences social, educational, economic, and political dimensions globally (UN, 2022).

This study sets out to examine the difference in the effectiveness of distance learning (DL) vs traditional learning (TL), but also the perspective of the students in secondary vocational education in the Netherlands (MBO). The reason for doing it at this time is to mitigate the aspect of DL which is related to it being an “emergency remote teaching” method using technology (Hodges, Moore, Lockee, Trust, & Bond, 2020).

In the MBO (Netherlands) DL has gone from emergency and mandatory remote teaching to contested and not preferred (MBO-Today, 2021). Albeda College, where I teach business economics and Accounting 101, supported DL greatly (Bormans & Damen, 2021). But they faced resistance from the government and also from students (and their parents) (MBO-Today, 2021).

But that was after a period of mandatory DL, in pandemic circumstances which may have colored the view of all parties. The question, of whether the view that students have on DL has changed, triggered this study. Economic courses were considered especially difficult when it came to DL as these courses contain the necessity of developing reading skills as well as mathematical skills. Assessing whether your students are acquiring those skills during DL was made difficult by different aspects such as; technical issues and limitations, lack of experience with DL both for the students as well as the teachers, the emergency aspect of DL that was the case during the COVID-19 pandemic.



MBO = Secondary/ intermediate vocational education

HBO = Higher Vocational Education

WO = Academic Education

[StatLine - Leerlingen en studenten; onderwijssoort, woonregio \(cbs.nl\)](https://statline.cbs.nl)

In the graph above we see the number of students that enrolled for new courses in the Netherlands for the past 3 years, divided on the level of education. We see that the MBO accounts for almost 38% of the students that enrolled in 2021. Of these 503K students approximately 80K to 90K students have courses in which Business Economics and/or Accounting basics (Accounting 101) are mandatory classes and others have the option to choose these classes as one of their electives.

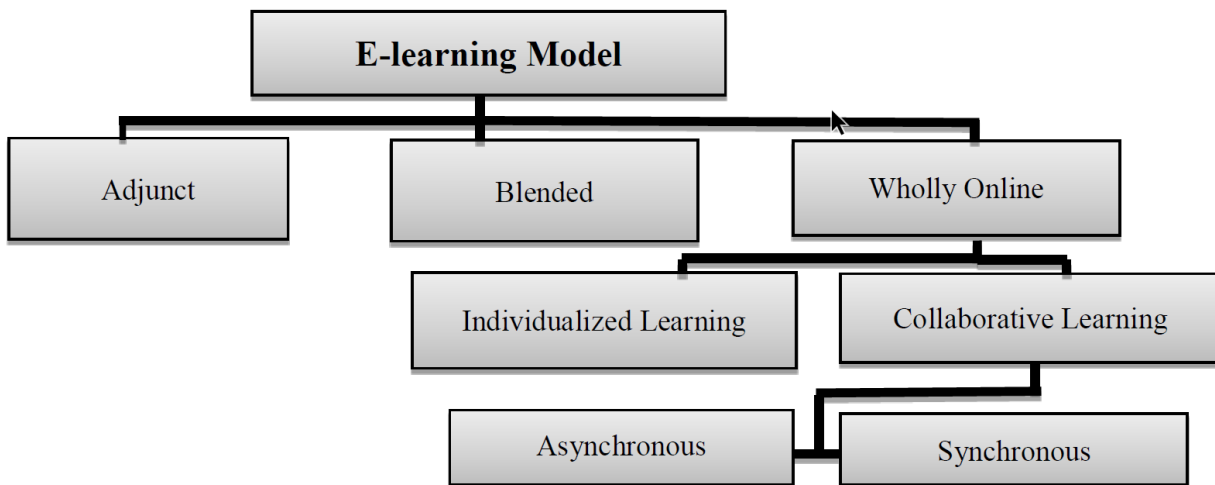
This giving makes this study relevant as it may give a perspective on the view that a large number of the students in the Netherlands on DL versus TL and the effectiveness of DL in a more controlled environment that is not colored by emergency aspects caused by the COVID-19 pandemic.

2. Literature Review

The article *Distance Learning as emergency remote teaching vs. traditional learning for accounting students during the COVID-19 pandemic: Cross-country Evidence* by Ghassan H. Mardini and Osama A. Mah'd, in the Journal of Accounting Education is my initial scientific source of inspiration for the research and the research methodology. Other relevant articles, used also by the aforementioned researcher, will be part of the literature review in the search for the expected outcomes.

In my study I will also focus on the five dimensions of DL (Mardini & Mah'd, 2022) namely; course content, interaction, skills, performance evaluation, and facilities.

In addition to this, I will also have the ability to evaluate results and with that, I will be able to also distinguish what kind of skills are taught and whether there is a difference between the students that followed DL vs TL. (Arkorful & Abaidoo, 2015) in their literature review study describe the different forms of e-learning in Education and visualize this in the following model.



Adapted from (Algahtani, 2011)

For this study, the type of DL that is being used falls in the category “Wholly Online, Collaborative Learning, Synchronous”. The DL classes will be online only and will be offered to all the students, using the synchronous method.

2.1 Literature review: DL vs TL; before and during the COVID-19 pandemic

In recent years, distance learning has gained popularity as a flexible educational option, aided by technological advancements. However, the COVID-19 pandemic significantly accelerated the adoption of online learning worldwide, including in the field of accounting education. This transition to online learning has brought both advantages and challenges for students and instructors alike.

The rapid transition to remote learning in response to the COVID-19 pandemic has necessitated a comprehensive examination of the factors that influence student engagement and success in online accounting education. This paper aims to explore the challenges faced by students and instructors in the situation after the COVID-19 pandemic, where DL is an emergency resolution but a potential structural part of the curriculum. The analysis of the result between students that had DL classes and those that had TL classes will also be an aspect that has not been conducted in a controlled environment as it is now. Furthermore, it could be an incentive for the more wide approach study in the Netherlands, where there is a varied field of opinions about the effects of DL whether negative or positive. By reviewing existing research and scholarly articles, this study aims to provide a comprehensive understanding of the topic.

Before the COVID-19 epidemic, there was already a growing body of research that compared distance learning (DL) and traditional learning (TL) in terms of their effectiveness in facilitating student learning outcomes. Some found that DL was just as effective as TL in promoting student learning outcomes, including cognitive and affective domains, when designed to be interactive and engaging. DL was found to be particularly effective for promoting deep learning, such as critical thinking and problem-solving skills this literature will be researched to enhance the approach and quality of my research.

A meta-analysis of 30 studies by (Means, Toyama, Murphy, Bakia, & Jones, 2009) revealed that students in DL performed modestly better than those in TL, with a small effect size of

0.24. This suggests that DL can be an effective mode of instruction for students, although the difference in performance between DL and TL is not substantial.

To ensure successful online learning, it is essential to consider the students' perspectives, needs, and abilities (Elhaty, Elhadary, El Gamil, & Kilic, 2020). Additionally, the use of different technologies, such as video content (Griffiths & Graham, 2009); (Lloyd & Robertson, 2012); (Mandernach, 2009), massive open online courses (MOOCs) (Kaplan & Haenlein, 2016), and synchronous and asynchronous participation (Love & Fry, 2006), can be beneficial in engaging students and facilitating their learning (Lei, et al., 2016).

Furthermore, (Mandernach, 2009) found that instructor-personalized multimedia can have a positive impact on student engagement in online learning, and (Mayer & Moreno, 2003) discussed ways to reduce cognitive load in multimedia learning. (McBrien, Cheng, & Jones, 2009) explored the use of a synchronous online classroom to enhance student engagement, and (McGuigan, 2021) discussed the need for future-proofing accounting education to prepare students for complexity and ambiguity.

In addition to incorporating these technologies, it is important to integrate quality attributes into course design (Lenert & Janes, 2017) and provide resources like screencast tutorials (Mayer & Moreno, 2003) and virtual spaces (McBrien, Cheng, & Jones, 2009) where students can actively engage in their learning. Moreover, when designing a course, consideration should be given to students' interactions in online social collaborative problem-based learning environments (Hussin, Harun, & Shukor, 2019)

The student experience of DL compared to TL has also been investigated in several studies. (Baumeister & Leary, 1995) surveyed undergraduate students and found that students in DL reported lower levels of social connectedness compared to those in TL. This lack of social interaction can have an impact on student's overall educational experience and their ability to form important relationships with peers and instructors.

On the other hand, (Manca & Ranieri, 2016) found that students in DL reported higher levels of satisfaction with their courses than those in TL. The study also revealed that students in DL reported higher levels of control over their learning environment, as they were able to choose when and where they completed coursework.

(Algahtani, 2011) evaluated the effectiveness of e-learning in some universities in Saudi Arabia by examining male students' perceptions. The study found that the majority of students felt that e-learning was convenient and flexible, allowing them to study at their own pace. However, they also reported missing the interaction with instructors and classmates and feeling isolated during the e-learning process.

While previous studies have shown that DL and TL have similar effectiveness in terms of academic performance, they have also highlighted that students may have a different experiences with each mode of learning. (Garrison & Cleveland-Innes, 2005) found that students in DL environments may experience feelings of isolation and a lack of interaction with their peers and instructors. Conversely, TL environments may offer more opportunities for face-to-face interaction and collaboration.

In the field of accounting education, the experience of DL and TL environments has been a topic of interest. For example, (Grace, Weaven, Bodey, Ross, & Weaven, 2012) explored the role of student evaluations in determining course experience and satisfaction, while (Griffiths & Graham, 2009) discussed the potential of asynchronous video in online education. (Hodges, Moore, Lockee, Trust, & Bond, 2020) compared emergency remote teaching and online learning, and (Hussin, Harun, & Shukor, 2019) conducted a review on the classification of students' interaction in online social collaborative problem-based learning environments.

In a recent study, (Carnegie, Parker, & Tsahuridu, 2021) emphasized the importance of educating students to navigate the complexities of the accounting profession in the post-COVID-19 world. (Currie & Courduff, 2015) examined the potential of augmented reality in

online education and highlighted its ability to provide a more immersive and interactive learning experience, enhancing student engagement and motivation.

(Draus, Curran, & Trempus, 2014) investigated the influence of instructor-generated video content on student satisfaction and engagement in asynchronous online classes. Their findings indicated that students who received video content from their instructors reported higher levels of satisfaction and engagement compared to those who did not receive it.

(Duncan, Kenworthy, & McNamara, 2012) explored the effect of synchronous and asynchronous participation on students' performance in online accounting courses. They found that students who participated in synchronous activities performed better than those who only participated in asynchronous activities.

2.2 Literature review: DL vs TL; during and after the COVID-19 pandemic

For a successful transition to online learning, students must possess the necessary technical and digital skills. Access to appropriate devices, reliable internet connection, and relevant resources is crucial for students to effectively engage in online accounting education. Moreover, instructors should consider the diverse needs of students, such as their language and cultural backgrounds, to ensure inclusive and equitable education. In addition to technical and digital proficiency, it is essential to design course content and assessment strategies that are both relevant and engaging. This allows students to demonstrate their understanding of the subject matter (Adnan & Anwar, 2020).

Furthermore, instructors should capitalize on the communication and collaboration capabilities of the online environment to foster active engagement and peer-to-peer learning. Providing timely and meaningful feedback on assignments and activities is also crucial for students' academic skill development (Adnan & Anwar, 2020).

Research indicates that students face a variety of challenges during online learning, particularly in the context of the COVID-19 pandemic. These challenges include a lack of motivation, difficulties in self-discipline, and technical issues (Adnan & Anwar, 2020). However, students also appreciate the flexibility and convenience offered by online learning (Adnan & Anwar, 2020); (Ali & Narayan, 2020). Although some students struggle with the virtual format and limited interaction with instructors and peers, others find online learning to be more flexible and engaging than traditional in-person classes (Ali & Narayan, 2020). To ensure effective student engagement, it is crucial to address these challenges and capitalize on the benefits of online learning.

Balancing Social Interaction and Flexibility

The pandemic has underscored the importance of social interaction in education, as students in online learning environments have reported increased feelings of isolation. However, online learning also provides students with more control over their learning environment, allowing them to choose the pace and place of their learning. Blended learning, which combines online and traditional elements, has shown promise in promoting student learning outcomes (Chen, Kashkeli, Raza, Hakim, & Khan, 2022). By blending the strengths of online and traditional learning, such as flexibility, accessibility, and face-to-face interaction, educators can optimize student engagement and learning outcomes (Chen, Kashkeli, Raza, Hakim, & Khan, 2022).

Supporting Students and Instructors in Online Accounting Education

To enhance student engagement and success, it is essential to provide comprehensive support to both students and instructors. For students, access to technical support, resources, and learning materials is vital (Elhaty, Elhadary, El Gamil, & Kilic, 2020); (Firmin, et al., 2014). Institutions should establish channels for regular communication and assist in navigating the online learning environment. Instructors should strive to provide clear instructions, engage students through interactive activities, and offer timely feedback on assignments and assessments (Adnan & Anwar, 2020). Faculty development programs should be implemented to support instructors in adapting to the demands of online

teaching, including training on effective online pedagogical practices and technical skills (Beatson, De Lange, O'Connell, Tharapos, & Smith, 2021).

Enhancing Technology Integration and Digital Literacy

As technology continues to play a central role in online accounting education, both students and instructors need to develop digital literacy skills. Institutions should offer training and resources to enhance students' proficiency in using digital tools, navigating learning management systems, and engaging in online collaboration. Instructors can provide tutorials, guides, and demonstrations to help students become familiar with online platforms and effectively utilize the available technological resources (Elhaty, Elhadary, El Gamil, & Kilic, 2020).

Continuous Evaluation and Improvement

Regular evaluation and feedback are vital for improving online accounting education. Institutions and instructors should gather feedback from students regarding their learning experiences, challenges faced, and suggestions for improvement (Beatson, De Lange, O'Connell, Tharapos, & Smith, 2021). This feedback can be collected through surveys, focus groups, or individual discussions. Analyzing student performance data, course completion rates, and engagement metrics can provide insights into the effectiveness of instructional strategies and identify areas for improvement.

Instructors should also engage in professional development activities and collaborate with colleagues to stay updated on best practices in online education. Sharing experiences, resources, and pedagogical strategies through online communities or faculty networks can foster continuous improvement in online accounting education.

A survey by (Yan, Guan, Chen, Whitelock-Wainwright, & Wen, 2021) explored students' online learning experiences during the COVID-19 pandemic. The study revealed that students encountered a range of challenges, including a lack of interaction with instructors and peers, technical difficulties, and a decrease in motivation. Nevertheless, students also acknowledged the flexibility and convenience that online learning offered, along with the opportunity to study from any location.

While research specifically focusing on the view of distance learning in the Netherlands post-COVID-19 is limited, a study by (De Boer, 2021) investigated the experiences and perspectives of higher education students in the Netherlands regarding online learning during the pandemic. The study found that students valued the flexibility and accessibility of online learning but also faced challenges such as a lack of interaction with peers and instructors, as well as difficulties in staying motivated.

Similarly, a study by (Spoel, Noroozi, Schuurink, & Ginkel, 2020) focused on the perspectives of Dutch higher education instructors on online teaching during the COVID-19 pandemic. The study found that instructors faced challenges such as a lack of interaction with students and difficulties in assessing student learning. However, instructors recognized the potential benefits of online teaching, such as increased accessibility for students and opportunities for innovation in teaching and assessment.

Expanding our perspective to the European context, although limited research specifically addresses the view of distance learning in Europe after the COVID-19 pandemic, (Spilker, Rocha, Afonso, & Morgado, 2021) conducted a study highlighting the accelerated adoption of distance learning across Europe. The study emphasized the increased demand for flexible learning options and the potential for higher education institutions to reach new students and provide access to quality education through distance learning (Spilker, Rocha, Afonso, & Morgado, 2021).

Furthermore, (EIT Digital, 2022) stressed the necessity of digital and online learning options in Europe, recognizing the impact of the pandemic on education. The report called for investment in digital infrastructure and the development of digital competencies among educators to support the implementation of effective distance learning programs.

Accounting Education: DL vs TL

Turning our attention to accounting education, various studies have explored the challenges and opportunities of online learning during the pandemic. For instance, (Ali &

Narayan, 2020) investigated student engagement in online accounting courses during the COVID-19 pandemic, finding that the availability of online resources, clear communication, and effective assessment strategies positively influenced student engagement.

(Arkorful & Abaidoo, 2015) discussed the advantages and disadvantages of e-learning in higher education, including accounting education. They highlighted the flexibility, convenience, and cost-effectiveness of e-learning, while also acknowledging challenges such as limited interaction, difficulty in maintaining student engagement, and inadequate technological infrastructure.

(Hodges, Moore, Lockee, Trust, & Bond, 2020) distinguished between emergency remote teaching (ERT) implemented during the pandemic and traditional online learning. They emphasized that ERT was a temporary solution to an emergency situation and lacked the interaction and support necessary for effective education. (Mardini & Mah'd, 2022) further compared ERT to traditional teaching methods and found that traditional teaching was more effective due to its enhanced interaction and support for students.

Considering the perspectives of accounting academics, (Beatson, De Lange, O'Connell, Tharapos, & Smith, 2021) and (Carnegie, Parker, & Tsahuridu, 2021) explored the factors impacting the motivation and capacity of accounting academics to adapt to the changes brought on by the pandemic. (Duncan, Kenworthy, & McNamara, 2012) and (Elhaty, Elhadary, El Gamil, & Kilic, 2020) focused on the effect of synchronous and asynchronous participation on student performance in online accounting courses.

2.2 Overview and personal view of the Findings in the literature review

The studies reviewed in this literature review suggest that the academic results and student experience of distance learning and traditional learning are mixed. While some studies have found that students in distance learning perform similarly or modestly better than their in-person peers, others have found that distance learning can impact students'

social connectedness and overall educational experience. Educators and institutions need to consider these findings as they make decisions about the mode of instruction they offer to students.

Distance learning and traditional learning have distinct advantages and disadvantages that should be taken into consideration when selecting a teaching or learning approach.

Distance learning offers greater flexibility in terms of when and where students can learn, as well as cost-saving benefits for both students and institutions. However, distance learning also has some significant disadvantages, such as the lack of personal interaction with teachers, which can make it difficult for students to stay motivated and engaged.

Additionally, access to technology is not always available or reliable, which can make it difficult for students to participate in distance learning activities.

Traditional learning, on the other hand, provides more opportunities for personal interactions between teachers and students, which can help to facilitate a more effective learning experience. Traditional learning also usually provides more access to resources, such as physical textbooks, laboratories, and other materials. However, traditional learning generally requires more resources and can be more expensive than distance learning.

To determine the most appropriate approach for a given situation, it is important to consider a variety of factors, such as the student's age, the type of learning material, available technology, and the learning environment. For example, younger students may benefit more from traditional learning, as they require more guidance and personal interaction to develop the necessary skills. Furthermore, the type of learning material should also be taken into consideration, as certain materials may be more suitable for distance learning, while other materials may be more effective with traditional learning. Additionally, the availability and reliability of technology are important factors that should be taken into consideration, as lack of access to technology can make it difficult for students to participate in distance learning activities. Finally, the learning environment should also be taken into account, as certain environments may be more conducive to traditional learning, while others may be more suitable for distance learning.

By considering these factors, educators and learners can more effectively select an approach that is tailored to the specific situation and can ensure the most effective learning experience for the students.

To summarize, the literature supports the findings that distance learning has both advantages and challenges in the field of accounting education, particularly in the context of the COVID-19 pandemic. While students and instructors appreciate the flexibility and accessibility of online learning, challenges such as limited interaction, motivation, and technological infrastructure exist. The studies also highlight the need for investment in digital infrastructure and the development of digital competencies among educators to effectively implement distance learning programs.

Ultimately, the choice between distance learning and traditional learning should be based on the context and the student population's needs. For example, distance learning may be a more feasible option for students who cannot access traditional learning due to financial constraints, or those with special needs or language barriers. On the other hand, traditional learning may be more beneficial for students who require more direct guidance and personal interaction with teachers. When selecting an approach, it is important to consider the advantages and disadvantages of each approach to determine which one will be most effective for the given situation.

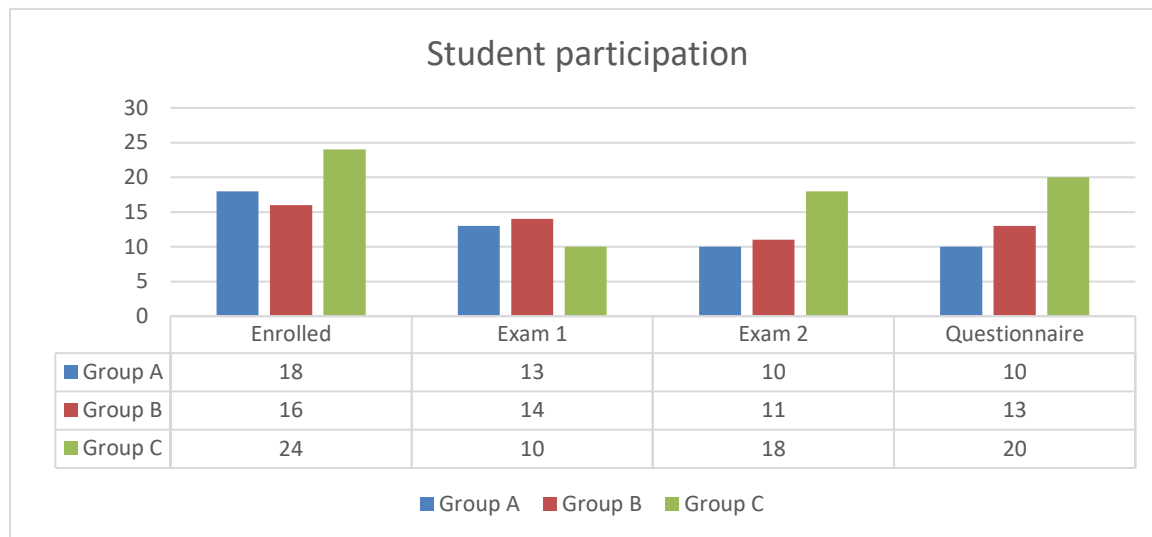
Furthermore, whichever approach is chosen it should be tailored to the specific situation and the needs of the students. By considering the various factors associated with distance learning and traditional learning, educators, and learners can ensure that the most effective learning experience is achieved.

However, further research is necessary to explore the specific views and experiences of students and instructors in the Netherlands and Europe, considering factors such as age, prior technology experience, and individual learning or teaching needs. Additionally, future studies should investigate the impact of distance learning on other student populations, such as those with disabilities or language barriers.

I believe this to be true therefore I have provided my students with a tailored online experience and traditional experience. They were free to have input about the content that was treated, they had the option to ask questions at any moment during my class. The use of OneNote during the online classes in combination with a writing tool provided a visual experience, with which I attempted to mimic a physical classroom experience. The TL groups also had access to To determine whether my expectations corresponded with the students' results and experiences of the students, the research, which is elaborated below, was carried out.

3. Research methodology: The Questionnaire and Exam Results

My research will be based on the following groups;



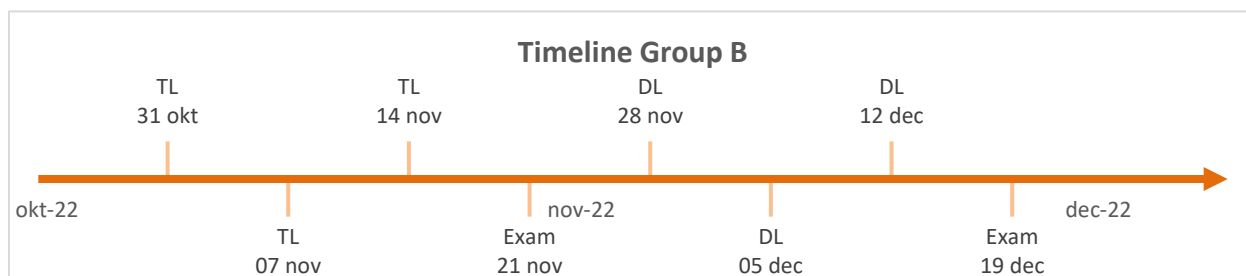
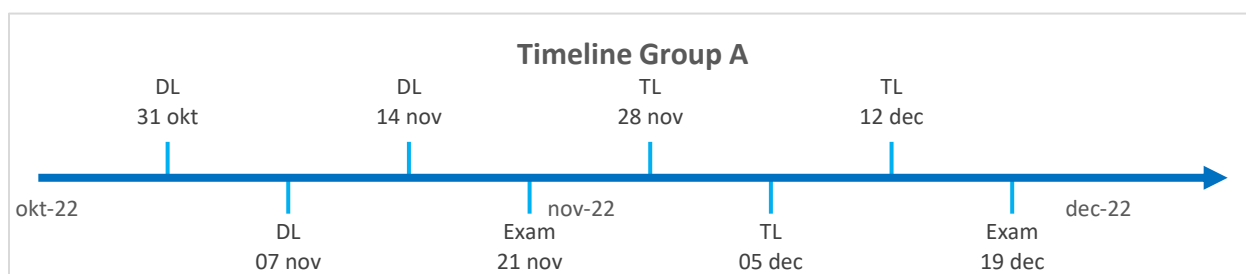
Enrolled: The number of students that were enrolled at the start of this year (school year 2022/2023).

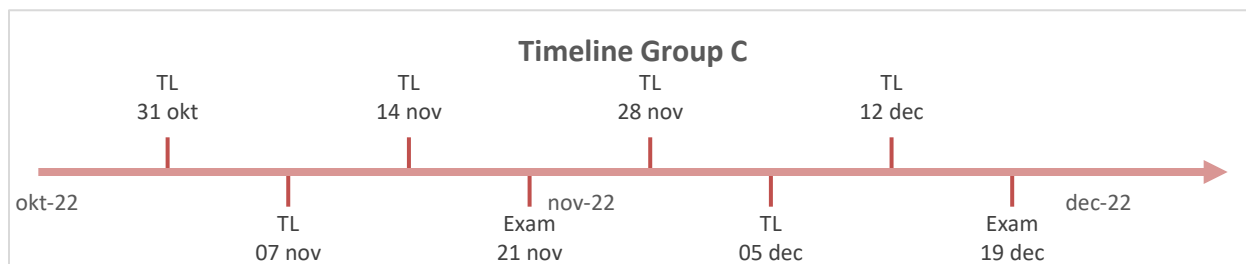
Exam 1: participants of the first exam

Exam 2: participants of the second exam

Questionnaire: number of students that answered the questionnaire

The following timelines will be used per group;





- Group A had the first half of the classes in the DL form and the other half in the TL form, after both periods there was an exam.
- Group B had the first half of the classes in the TL form and the other half in the DL form, after both periods there was an exam.
- Group C is the control group and had all their classes in TL form.

This timeline and methodology are chosen for the following reasons;

- These classes consist of real students, that are preparing for national exams as well as school exams.
- Their time is limited, in the second part of the year they have to start internships. During their internship, they only have one moment in which classes can be planned. This makes planning DL classes less practical.
- Lastly considering the level of Accounting in this course, the level of the exams, and the main goal of the study being the perception and evaluation of the student's experience of distance learning (DL), this timeline will need to be sufficient.

The exams will serve as an objective tool to measure the acquired skills. For the examination of the perception of students concerning distance learning versus traditional learning, I will be using a questionnaire.

The questionnaire that will be given to the students will contain open and closed questions about their experience with DL vs TL and their perception of the effectiveness of both. These questions will be designed to obtain a clear view of the student's experiences and opinions. The results of this questionnaire will be analyzed and compared with the exam

results. The exam results will be used to compare the performance of the students in both DL and TL, this will give an insight into the effectiveness of both methods. The results will be analyzed using descriptive statistics, such as mean, median, mode, standard deviation, and percentiles.

The study will be conducted in a controlled environment, to minimize the influence of extraneous variables. The data collection process will take place over a period of three months. The questionnaires will be distributed online, and the students will be given sufficient time to complete them. The results will be collected and analyzed, and a conclusion will be written to summarize the findings.

In conclusion, the research will be aimed at examining the difference in the effectiveness of DL vs TL in secondary vocational education in the Netherlands (MBO).

The focus will be on the student's perspective. The results of this study will provide valuable insights into the benefits and limitations of DL, and the impact it has on the learning outcomes of students. The results will also contribute to the ongoing debate about the use of DL in education and its impact on student performance.

There has been a significant amount of research on the topic of distance learning versus traditional learning. Before the COVID-19 epidemic, studies compared these two modes of education in terms of student outcomes, engagement, and overall effectiveness as mentioned during the literature review.

I will send all my students a questionnaire based on the questionnaire of (Mardini & Mah'd, 2022). This will be used to evaluate the perception of the students.

This questionnaire is modified to match the level of the students and the situation in which DL is not mandatory for the other classes. The topics in the questionnaire will be the following;

- General and demographic information
 - o Gender (Male, Female, I do not want to answer)

- Home situation (e.g. do you have the ability to follow the class quietly, either at home or some other place?)
- Ethnicity (Dutch or Other)
- Software usage
 - The used software will be predetermined, as the school has guidelines concerning used software.
 - MS Teams is used as the online platform for DL classes.
 - MS OneNote will be used during the DL classes within MS Teams to interact with the students and display the content.
- Perspective on DL
 - For this part of the questionnaire, the questions will match those of the study done (Mardini & Mah'd, 2022), but the questions will be adjusted slightly to match the students and situation.
- DL vs TL
 - For this part of the questionnaire, the questions will match those of the study done (Mardini & Mah'd, 2022), but the questions will be adjusted slightly to match the students and situation.
- And a few open questions
 - For this part of the questionnaire, the questions will match those of the study done (Mardini & Mah'd, 2022), but the questions will be adjusted slightly to match the students and situation.

During the evaluation of both the exams and the questionnaire, I will anonymize both the results of the exams as well as the answers to the questionnaire.

To still be able to match the answers to the questionnaire (anonymously) with the exam results a random number will be assigned to each student which can only be related to the exam results and questionnaire and not to the individual students.

4. Results and Discussion

4.1 Approach

To provide a complete view of the situation I decided to perform the analysis of the performance data in two separate sessions. The first one was the version where I used all the results and in the second one, I excluded the result of students that did not take both exams.

I did not perform a third analysis excluding the students that did not participate in all classes. The reason for this was the fact that all classes were recorded and made available to all students. In Teams, it was visible that all students viewed the recordings, at least one time before both exams. Therefore I concluded that excluding these students would not most probably not provide a significant difference.

Also taking into account that none of the students, that took at least one of the exams, missed more than two of the total classes. Missing more than two classes would deny the students the right to the exams.

To be as complete as possible, I included the result of the data analysis in the appendix and in the footnotes of the data analysis including all students. For this analysis the following is done: Of the 58 students who participated in the study, 28 were excluded for failing to participate in one of the exams leaving only 30 to be used in the analysis. Out of 28 excluded, 21 were excluded because they did not participate in Exam 1 and 7 for not participating in Exam 2.

To exclude any significant difference in exam results between and within groups, I performed the same tests on both the results of Exam 1 and Exam 2.

Besides the analysis of the result, I also reviewed the answers to the questionnaire concerning the results.

4.1.1 Data

The following data was used to perform the analysis:

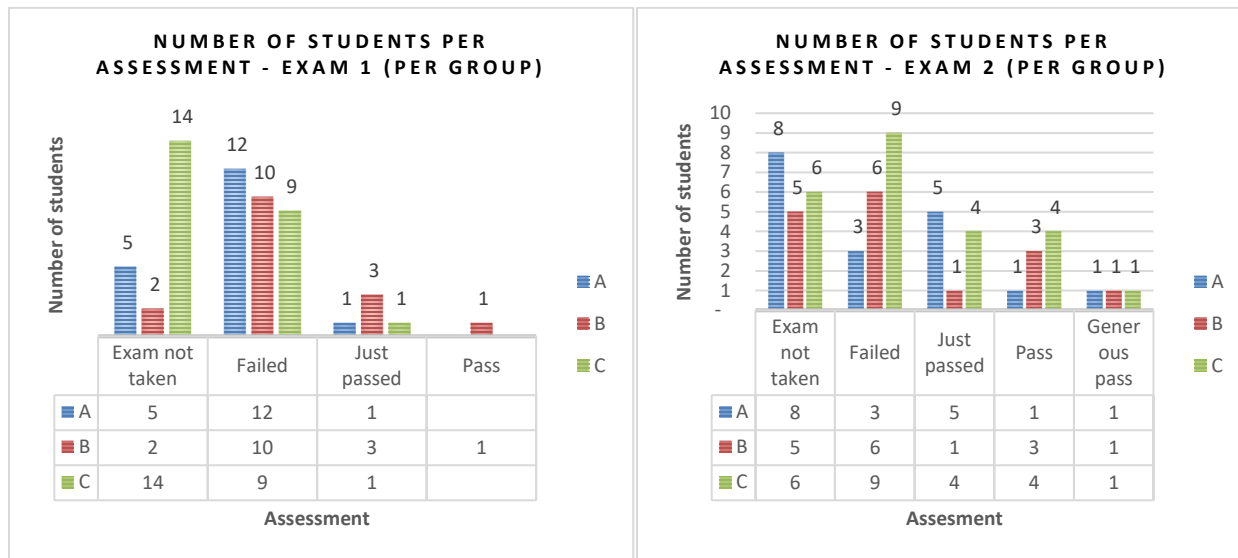


Figure A: Number of students per assessment - Exam 1 Figure B: Number of students per assessment - Exam 2

Figure A and B, show the number of students, per group, categorized based on their assessment. The following assessment categories were used:

Grade	1,0	1,5	5,5	6,0	7,0	8,0	9	10
Assessment	Exam not taken	Failed	Just passed	Pass	Generous pass	Good	Very Good	Excellent

All grades from 1,5 to 5,4 are considered a fail, there is no minimum grade required.

Our institution uses a 1,5 as the lowest grade for students who at least took the exam and a 1,0 for those who did not take the exam. This is only the case for our institutional exams and test, whereas, for the national exam, a 1,0 is the lowest grade.

The exam results for each exam will be used to analyze whether there is a significant difference between the group. But to determine the effect of DL vs TL on the result of the student I also the variable "Improvement". Improvement in the study is seen as the difference between both Exams (Exam 2 minus Exam 1).

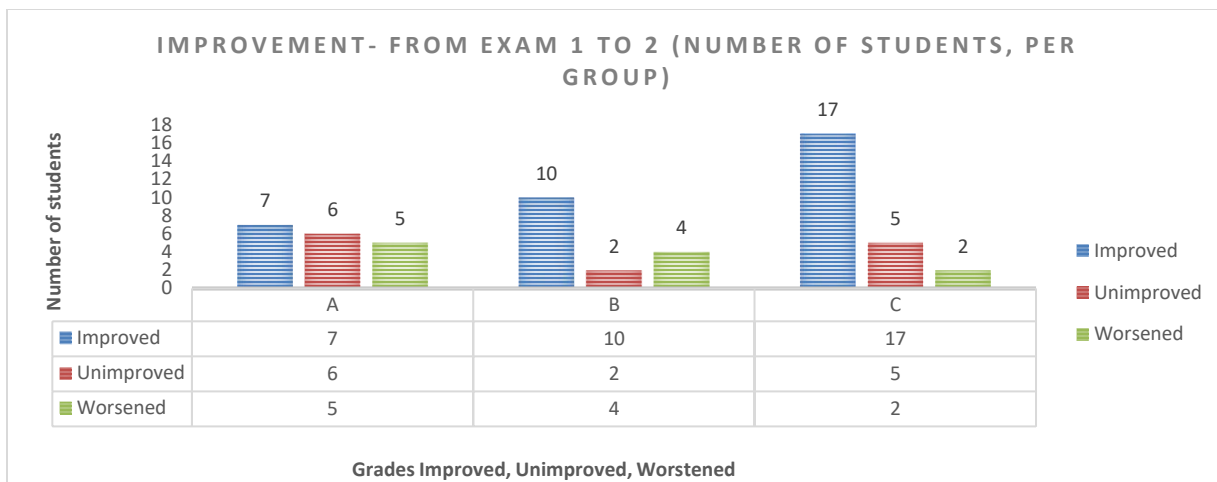


Figure C: Improvement- from Exam 1 to 2 (number of students, per group)



Figure D: Improvement, expressed as the difference between Exam 1 and Exam 2 (per group)

Figure C shows the number of students that improved, unimproved, or even worsened their grades. This data is part of the analysis that will be performed. It will be used to determine whether there is a significant difference in the improvement of students between the groups. Figure 4, shows us the difference in Improvement, divided by minimum, maximum, and average improvement. This difference might show us which is more effective DL or TL¹.

¹ Group A had the first half of the classes in the DL form and the other half in the TL form, after both periods there was an exam.

Group B had the first half of the classes in the TL form and the other half in the DL form, after both periods there was an exam.

Group C is the control group and had all their classes in TL form.

4.2 Data Analysis

4.2.1 Data Analysis (including all participants)

ANOVA (Analysis of Variance)

The data used to conduct ANOVA was collected from three groups of students: A, B, and C. Group A, had the first three classes online, then the first exam; after this, they had three regular classes and the second exam. Group B had three regular classes, then the first exam, and after this, they had three online classes and the second exam. And Group C had regular classes and took the same exams (this was intended to be the control group) (Mishra, Singh, Pandey, Mishra, & Pandey, 2019). ANOVA was used to know if there was a significant difference between the mean improvement of the three groups of students (Thango, 2022). The statistical test because it makes it easy to compare the means of three or more groups at once. ANOVA gives a single test to assess whether there are significant differences among the groups, as opposed to running multiple t-tests. The result of the ANOVA for the three groups is shown below.


```
. oneway Improvement Group, tabulate
```

Group	Summary of Improvement			Freq.
	Mean	Std. dev.		
Group A	.57222222	1.779559		18
Group B	.125	1.6035378		16
Group C	2.0958333	2.2038463		24
Total	1.0793103	2.0863599		58

Analysis of variance					
Source	SS	df	MS	F	Prob > F
Between groups	43.999478	2	21.999739	5.93	0.0047
Within groups	204.115694	55	3.71119444		
Total	248.115172	57	4.35289776		

Bartlett's equal-variances test: chi2(2) = 1.9629 Prob>chi2 = 0.375

Figure 1: ANOVA Results of the Three Groups

As seen from Figure 1 above, Group C, which had Traditional Learning throughout, recorded the highest average mean score, followed by Group A, which had three online classes and then proceeded to regular classes. The lowest mean was recorded among group B. ANOVA revealed a P-Value of 0.0047², lower than the significance level of 0.05. It is important to note that the P value for two tails is used because, in the test, there was no specific null hypothesis stating which group is different from the other. Nevertheless, the result indicates a significant difference between the mean of the three groups. In other words, the results show that traditional learning is more effective than long-distance learning regarding students' academic performance.

However, ANOVA did not show which of the three groups improved the most. As a result, the post-hoc test was conducted. The post-hoc test involves independent samples T-test between the three groups (Gerald, 2018). The independent sample T-test was between group A and group B. The result is shown below.

² ANOVA results, excluding participants that did not take both exams: P-value of 0.475, higher than the significance level of 0.05, showing no significant improvement difference between the groups.

```

. ttest GroupA == GroupB, unpaired unequal

Two-sample t test with unequal variances

```

Variable	Obs	Mean	Std. err.	Std. dev.	[95% conf. interval]
GroupA	18	.5722222	.4194461	1.779559	-.3127316 1.457176
GroupB	16	.125	.4008844	1.603538	-.729465 .979465
Combined	34	.3617647	.2896003	1.688646	-.2274316 .950961
diff		.4472222	.5802097		-.7346402 1.629085

```

diff = mean(GroupA) - mean(GroupB)          t =  0.7708
H0: diff = 0          Satterthwaite's degrees of freedom = 31.9904

Ha: diff < 0          Ha: diff != 0          Ha: diff > 0
Pr(T < t) = 0.7768    Pr(|T| > |t|) = 0.4465    Pr(T > t) = 0.2232

```

Figure 2: T-Test Between Group A and B

From the result above, the P-value is 0.4465³, higher than the significant level of 0.05. Hence, the P-value reveals that even though there was a difference in the mean of improvement between the two groups, the difference was not statistically significant. In other words, taking online classes regular classes or vice versa may not produce statistically different results. Furthermore, this test only compares the improvements, it does not take into account that the individual results of exam 1 and exam 2 might have been higher in one or more groups. Improving a 9 (when a 10 is the highest score) is generally more difficult than improving a 5 (a non-passing grade) because there is just less room for improvement between a 9 and a 10 in comparison to an improvement between a 5 and a 10.

The second T-test was between groups A and C, and the result was significantly different from the first test. The result is shown below.

³ T-Test Between Group A and B, excluding participants that did not take both exams: P-value of 0.3699, higher than the significance level of 0.05, showing no significant improvement difference between groups A and B.

```
. ttest GroupA == GroupC, unpaired unequal
```

Two-sample t test with unequal variances

Variable	Obs	Mean	Std. err.	Std. dev.	[95% conf. interval]	
GroupA	18	.5722222	.4194461	1.779559	-.3127316	1.457176
GroupC	24	2.095833	.4498582	2.203846	1.165231	3.026436
Combined	42	1.442857	.331665	2.149435	.7730461	2.112668
diff		-1.523611	.615067		-2.766962	-.28026

diff = mean(GroupA) - mean(GroupC) t = -2.4771
H0: diff = 0 Satterthwaite's degrees of freedom = 39.7391

Ha: diff < 0 Ha: diff != 0 Ha: diff > 0
Pr(T < t) = 0.0088 Pr(|T| > |t|) = 0.0176 Pr(T > t) = 0.9912

Figure 3: T-Test Between Group A and C

The result from the test above shows that the P-Value was 0.0176⁴, which is lower than the significant level of 0.05. Hence, the result is enough to reject the null hypothesis that there is no significant difference between the two groups' performance improvement (Palvia, et al., 2018). From the result, it is evident that Group C students performed far better than Group A students. The question remains whether TL or DL is more effective. Considering both A and C had TL classes after exam 1.

The second T-test was between groups B and C, and the result was significantly different compared to the first test. The result is shown below.

⁴ T-Test Between Group A and C, excluding participants that did not take both exams: P-value of 0.7881, higher than the significance level of 0.05, showing no significant improvement difference between groups A and C.

. ttest GroupB == GroupC, unpaired unequal						
Two-sample t test with unequal variances						
Variable	Obs	Mean	Std. err.	Std. dev.	[95% conf. interval]	
GroupB	16	.125	.4008844	1.603538	-.729465	.979465
GroupC	24	2.095833	.4498582	2.203846	1.165231	3.026436
Combined	40	1.3075	.3467503	2.193041	.6061314	2.008869
diff		-1.970833	.6025618		-3.191041	-.7506261
diff = mean(GroupB) - mean(GroupC)				t = -3.2708		
H0: diff = 0		Satterthwaite's degrees of freedom = 37.6387				
Ha: diff < 0		Ha: diff != 0		Ha: diff > 0		
Pr(T < t) = 0.0011		Pr(T > t) = 0.0023		Pr(T > t) = 0.9989		

Figure 4: T-Test Between Group B and C

The result above shows that the P-Value is 0.0023⁵, less than the significant level of 0.05. Thus, the result shows that the difference in mean between the two groups was statistically significant. However, in this case, the P-value was smaller than that of the t-test between A and B, showing that traditional learning is more effective than online learning (Basilaia & Kvavadze, 2020). In other words, those who participated in online learning recorded better-improved performance than those who participated in regular classes and then shifted to online (Sadeghi, 2019). Overall, traditional learning produced a better result compared to long-distance learning, when exclusively looking at the improvement between the groups.

Even though the tests show a significant difference in the improvement, which is the main indicator in this analysis, it does not take into account that the individual results of exam 1 and exam 2 might have been higher in one or more groups. Improving a 9 (when a 10 is the highest score) is generally more difficult than improving a 5 (a non-passing grade) because there is just less room for improvement between a 9 and a 10 in comparison to an improvement between a 5 and a 10.

⁵ T-Test Between Group B and C, excluding participants that did not take both exams: P-value of 0.2416, higher than the significance level of 0.05, showing no significant improvement difference between groups B and C.

ANOVA analysis was also used to determine the effects of demographic variables on the mean improvement of students of different groups. The first test was on gender and aimed to determine if the performance varied across genders. The result is shown below.

```
. oneway Improvement Gender, tabulate
```

Gender	Summary of Improvement			Freq.
	Mean	Std. dev.		
Female	1.85625	2.1250784		16
Man	1.1740741	2.2531333		27
Not answe..	.08	1.2957072		15
Total	1.0793103	2.0863599		58

Source	Analysis of variance				
	SS	df	MS	F	Prob > F
Between groups	24.8799456	2	12.4399728	3.06	0.0547
Within groups	223.235227	55	4.05882231		
Total	248.115172	57	4.35289776		

Bartlett's equal-variances test: chi2(2) = 4.8135 Prob>chi2 = 0.090

Figure 5: Gender

From the figure above, the P-Value is 0.0547⁶, slightly higher than the significant level of 0.05. The result indicates no statistical difference in the mean of improved performance between the various genders. In other words, gender did not impact the performance in the result.

The following demographic that was tested was ethnicity. The statistical test aimed to analyze if the students' performance varied depending on their race, and the result is shown below.

⁶ ANOVA results excluding participants that did not take both exams: P-value of 0.3239, higher than the significance level of 0.05, showing no significant improvement difference between the various genders.

```
. oneway Improvement Ethnicity, tabulate
```

Ethnicity	Summary of Improvement			F	Prob > F
	Mean	Std. dev.	Freq.		
Dutch;	1.7411765	1.7944563	17	2.53	0.0514
Dutch;Non-Dut..	-1	3.122499	3		
Non-Dutch;	1.5181818	2.328424	22		
Non-Dutch;Dut..	1.4	0	1		
Not answered	.08	1.2957072	15		
Total	1.0793103	2.0863599	58		

Analysis of variance					
Source	SS	df	MS	F	Prob > F
Between groups	39.7372687	4	9.93431717	2.53	0.0514
Within groups	208.377904	53	3.93165856		
Total	248.115172	57	4.35289776		

Bartlett's equal-variances test: $\chi^2(3) = 6.0948$ Prob> $\chi^2 = 0.107$

note: Bartlett's test performed on cells with positive variance:
1 single-observation cells not used

Figure 6: Ethnicity

The P-value is 0.0514⁷, slightly higher than the significant value of 0.05. The result shows that the difference between the means was not statistically significant. In other words, student performance in online or traditional learning was not associated with ethnicity. The following demographic that was tested was the birthplace. The statistical test aimed to analyze if the students' performance varied depending on their country of origin, and the result is shown below.

⁷ ANOVA results, excluding participants that did not take both exams: P-value of 0.5322, higher than the significance level of 0.05, showing no significant improvement difference associated to ethnicity.

```
. oneway Improvement Birthplace, tabulate
```

Birthplace	Summary of Improvement		
	Mean	Std. dev.	Freq.
Netherlands	1.4157895	2.323386	38
Not answered	.08	1.2957072	15
Other than the Netherlands..	1.52	1.0756393	5
Total	1.0793103	2.0863599	58

Analysis of variance					
Source	SS	df	MS	F	Prob > F
Between groups	20.2526461	2	10.126323	2.44	0.0962
Within groups	227.862526	55	4.14295502		
Total	248.115172	57	4.35289776		

Bartlett's equal-variances test: chi2(2) = 7.5416 Prob>chi2 = 0.023

Figure 7: Birthplace

The P-value is 0.0962⁸, slightly higher than the significant value of 0.05. The result shows that the difference between the means was not statistically significant. In other words, student performance in online or traditional learning was not associated with birthplace. Additionally, ANOVA was used to analyze the difference in mean of improved performance depending on the place of taking online classes. The analysis was aimed to see if there is variation depending on the place of taking online classes. The result is shown below.

⁸ ANOVA results, excluding participants that did not take both exams: P-value of 0.3606, higher than the significance level of 0.05, showing no significant improvement difference associated with birthplace.

```
. oneway Improvement Areyouabletofollowonlinecl, tabulate
```

Are you able to follow online classes from home or a other place	Summary of Improvement		
	Mean	Std. dev.	Freq.
No, not at home or other locat..	6.3	0	1
Not answered	.08	1.2957072	15
Yes, at home	1.3119048	2.0958964	42
Total	1.0793103	2.0863599	58

Analysis of variance					
Source	SS	df	MS	F	Prob > F
Between groups	44.5071248	2	22.2535624	6.01	0.0044
Within groups	203.608048	55	3.7019645		
Total	248.115172	57	4.35289776		

Bartlett's equal-variances test: chi2(1) = 3.9531 Prob>chi2 = 0.047

note: Bartlett's test performed on cells with positive variance:
1 single-observation cells not used

Figure 8: Place of Taking Online Class

From the figure above, the P-value is 0.0044⁹, which is lower than the significance level of 0.05. Therefore, the place of taking online classes is associated with exam performance. Having the ability to take online classes from home (or another suitable location), has a significant effect on the result. This is something that was a far greater issue during the Covid-19 epidemic, than it is now. Where during the Covid-19 epidemic families were all working/studying at home at the same time, now the students were generally home alone or in a much lower number. This made it a far better experience, something I see in the answers to the questionnaire.

⁹ ANOVA results, excluding participants that did not take both exams: P-value of 0.2040, higher than the significance level of 0.05, showing no significant improvement difference associate with the place of taking online classes.

4.2.2 Data Analysis of the exam results (Exam 1)

To exclude any significant difference in exam results between and within groups, I performed an ANOVA (Analysis of Variance) test for both the result of Exam 1 and Exam 2.

```
. oneway Exam1grade Group, tabulate
```

Group	Summary of Exam 1 grade		
	Mean	Std. dev.	Freq.
A	2.8777778	1.6082711	18
B	3.3375	1.8304371	16
C	1.95	1.4071247	24
Total	2.6206897	1.6752856	58

Source	Analysis of variance				
	SS	df	MS	F	Prob > F
Between groups	20.2065613	2	10.1032807	3.98	0.0244
Within groups	139.768611	55	2.54124747		
Total	159.975172	57	2.80658197		

Bartlett's equal-variances test: chi2(2) = 1.2610 Prob>chi2 = 0.532

Figure 1: ANOVA for the three groups, results from Exam 1

As seen from the figure above, Group C, which had Traditional Learning throughout, recorded the lowest average mean score for exam 1, followed by Group A, which had three Distance Learning before taking this exam. The highest mean was recorded among group B, which had Traditional Learning before taking this exam. ANOVA revealed a P-Value of 0.0244, lower than the significance level of 0.05. It is important to note that the P value for two tails is used because, in the test, there was no specific null hypothesis stating which group is different from the other. Nevertheless, the result indicates a significant difference between the mean of the three groups.

The post-hoc test was conducted to determine the difference between the groups, that might show the effectiveness of DL and/or TL. The post-hoc test involves independent

samples T-test between the three groups (Gerald, 2018). The independent sample T-test was between group A and group B. The result is shown below.

```
. ttest GroupA == GroupB, unpaired unequal
```

Two-sample t test with unequal variances

Variable	Obs	Mean	Std. err.	Std. dev.	[95% conf. interval]	
GroupA	18	2.877778	.3790731	1.608271	2.078003	3.677552
GroupB	16	3.3375	.4576093	1.830437	2.362129	4.312871
Combined	34	3.094118	.2925376	1.705773	2.498945	3.68929
diff		-.4597222	.5942244		-1.67307	.7536253

diff = mean(GroupA) - mean(GroupB) t = -0.7737
H0: diff = 0 Satterthwaite's degrees of freedom = 30.1307

Ha: diff < 0 Ha: diff != 0 Ha: diff > 0
Pr(T < t) = 0.2226 Pr(|T| > |t|) = 0.4452 Pr(T > t) = 0.7774

Figure 2: T-Test Between Group A and B (Exam 1)

From the result above, the P-value is 0.4452, higher than the significant level of 0.05. Hence, the P-value reveals that even though there was a difference in the mean of the results of Exam 1 between the two groups, the difference was not statistically significant. In other words, taking online classes regular classes or vice versa may not produce statistically different results.

The second T-test was between groups A and C, and the result significantly differed from the first test. The result is shown below.

```

. ttest GroupA == GroupC, unpaired unequal
Two-sample t test with unequal variances

```

Variable	Obs	Mean	Std. err.	Std. dev.	[95% conf. interval]	
GroupA	18	2.877778	.3790731	1.608271	2.078003	3.677552
GroupC	24	1.95	.2872281	1.407125	1.355823	2.544177
Combined	42	2.347619	.2390029	1.548916	1.864943	2.830295
diff		.9277778	.4756011		-.038895	1.894451

```

diff = mean(GroupA) - mean(GroupC)          t =  1.9507
H0: diff = 0                    Satterthwaite's degrees of freedom =  33.8716

Ha: diff < 0                    Ha: diff != 0                    Ha: diff > 0
Pr(T < t) = 0.9703              Pr(|T| > |t|) = 0.0594              Pr(T > t) = 0.0297

```

Figure 3: T-Test Between Group A and C (Exam 1)

From the result above, the P-value is 0.0594, higher than the significant level of 0.05. Hence, the P-value reveals that even though there was a difference in the mean of the results of Exam 1 between the two groups, the difference was not statistically significant. In other words, taking online classes regular classes or vice versa may not produce statistically different results.

The second T-test was between groups B and C, and the result was significantly different compared to the first test. The result is shown below.

```

. ttest GroupB == GroupC, unpaired unequal
Two-sample t test with unequal variances

```

Variable	Obs	Mean	Std. err.	Std. dev.	[95% conf. interval]	
GroupB	16	3.3375	.4576093	1.830437	2.362129	4.312871
GroupC	24	1.95	.2872281	1.407125	1.355823	2.544177
Combined	40	2.505	.270658	1.711792	1.957542	3.052458
diff		1.3875	.5402835		.2778865	2.497114

```

diff = mean(GroupB) - mean(GroupC)          t = 2.5681
H0: diff = 0          Satterthwaite's degrees of freedom = 26.4681

Ha: diff < 0          Ha: diff != 0          Ha: diff > 0
Pr(T < t) = 0.9919    Pr(|T| > |t|) = 0.0162    Pr(T > t) = 0.0081

```

Figure 4: T-Test Between Group B and C (Exam 1)

The result above shows that the P-Value is 0.0162, less than the significant level of 0.05. Thus, the result shows that the difference in mean between the two groups was statistically significant. However, in this case, we need to notice that both groups B and C had three TL classes before taking the exam. This means that the P-Value, even though it shows a significant difference between the groups, does not show us whether TL or DL is more effective. This is one of the presumptions that drove me to perform the initial data analysis based on the improvement and not just the results.

4.2.3 Data Analysis of the exam results (Exam 2)

As mentioned above I also performed an ANOVA (Analysis of Variance) test for the result of Exam 2.

```
. oneway Exam2grade Group, tabulate
```

Group	Summary of Exam 2 grade			F	Prob > F
	Mean	Std. dev.	Freq.		
A	3.45	2.4125286	18	0.46	0.6352
B	3.4625	2.4325227	16		
C	4.0458333	2.1532542	24		
Total	3.7	2.2912496	58		

Source	Analysis of variance			F	Prob > F
	SS	df	MS		
Between groups	4.89791667	2	2.44895833	0.46	0.6352
Within groups	294.342083	55	5.35167424		
Total	299.24	57	5.24982456		

Bartlett's equal-variances test: $\chi^2(2) = 0.3566$ Prob> $\chi^2 = 0.837$

Figure 1: ANOVA for the three groups, results from Exam 2

As seen from the figure above, Group C, which had Traditional Learning throughout, recorded the lowest average mean score for exam 1, followed by Group A, which had three Distance Learning before taking this exam. The highest mean was recorded among group B, which had Traditional Learning before taking this exam. ANOVA revealed a P-Value of 0.6352, higher than the significance level of 0.05. It is important to note that the P value for two tails is used because, in the test, there was no specific null hypothesis stating which group is different from the other. Nevertheless, the result indicates no significant difference between the mean of the three groups.

The post-hoc test was conducted to determine the difference between the groups, that might show the effectiveness of DL and/or TL. The post-hoc test involves independent

samples T-test between the three groups (Gerald, 2018). The independent sample T-test was between group A and group B. The result is shown below.

```
. ttest GroupA == GroupB, unpaired unequal
```

Two-sample t test with unequal variances

Variable	Obs	Mean	Std. err.	Std. dev.	[95% conf. interval]	
GroupA	18	3.45	.5686384	2.412529	2.250278	4.649722
GroupB	16	3.4625	.6081307	2.432523	2.1663	4.7587
Combined	34	3.455882	.4090158	2.384952	2.623733	4.288031
diff		-.0125	.8325699		-1.709511	1.684511

```
diff = mean(GroupA) - mean(GroupB)                                t = -0.0150
H0: diff = 0                                       Satterthwaite's degrees of freedom = 31.4698

Ha: diff < 0                                     Ha: diff != 0                                     Ha: diff > 0
Pr(T < t) = 0.4941                               Pr(|T| > |t|) = 0.9881                               Pr(T > t) = 0.5059
```

Figure 2: T-Test Between Group A and B (Exam 2)

From the result above, the P-value is 0.9881, higher than the significant level of 0.05. The ANOVA test did not show a significant difference between the mean of the results of Exam 2, this is also shown in this test. In other words, taking online classes or regular classes may not produce statistically different results.

The second T-test was between groups A and C, and the result significantly differed from the first test. The result is shown below.

```

. ttest GroupA == GroupC, unpaired unequal
Two-sample t test with unequal variances

```

Variable	Obs	Mean	Std. err.	Std. dev.	[95% conf. interval]	
GroupA	18	3.45	.5686384	2.412529	2.250278	4.649722
GroupC	24	4.045833	.4395312	2.153254	3.136594	4.955073
Combined	42	3.790476	.3485795	2.259053	3.086506	4.494447
diff		-.5958333	.7187053		-2.055908	.8642416

```

diff = mean(GroupA) - mean(GroupC) t = -0.8290
H0: diff = 0 Satterthwaite's degrees of freedom = 34.3255

Ha: diff < 0 Ha: diff != 0 Ha: diff > 0
Pr(T < t) = 0.2064 Pr(|T| > |t|) = 0.4128 Pr(T > t) = 0.7936

```

Figure 3: T-Test Between Group A and C (Exam 2)

From the result above, the P-value is 0.4128, higher than the significant level of 0.05. In this test, we can take the same conclusion as with the comparison between groups A and B. In other words, taking online classes or regular classes may not produce statistically different results.

The second T-test was between groups B and C, and the result was significantly different compared to the first test. The result is shown below.

```
. ttest GroupB == GroupC, unpaired unequal
```

Two-sample t test with unequal variances

Variable	Obs	Mean	Std. err.	Std. dev.	[95% conf. interval]	
GroupB	16	3.4625	.6081307	2.432523	2.1663	4.7587
GroupC	24	4.045833	.4395312	2.153254	3.136594	4.955073
Combined	40	3.8125	.3568593	2.256976	3.090684	4.534316
diff		-.5833333	.7503403		-2.116795	.9501284

diff = mean(GroupB) - mean(GroupC) t = -0.7774
H0: diff = 0 Satterthwaite's degrees of freedom = 29.5124

Ha: diff < 0 Ha: diff != 0 Ha: diff > 0
Pr(T < t) = 0.2215 Pr(|T| > |t|) = 0.4431 Pr(T > t) = 0.7785

Figure 4: T-Test Between Group B and C (Exam 2)

From the result above, the P-value is 0.4431, higher than the significant level of 0.05. In this test, we can take the same conclusion as with the comparison between groups A and C. In other words, taking online classes or regular classes may not produce statistically different results.

These tests in general show that there is no significant difference in the result between groups that had online classes and then regular classes or vice versa in Exam 2. The only significant difference was between group B and group C in Exam 1, which were both classes that before taking Exam 1 only had traditional classes. Group B had significantly had a higher mean. A possible cause for this difference could be cases by the fact that for Exam 1, group C had the largest number of students that did not take the exam and were graded with a 1.0 (One point zero). I decided to include those results and not exclude them (as I did for the analysis of the improvement), is because most students answered that they did not prepare for the first exam and were almost sure that they would not score well. This makes me assume that even if they took the exam, the results would not be significantly different.

4.3 Overview Questionnaire

I used a questionnaire to explore the perception of students regarding the effectiveness of distance learning (DL) vs traditional learning (TL). The participants that were chosen belonged to my institution that used the DL synchronous teaching approach. In a DL lecture environment, students participated in classes and live discussions from the comfort of their own homes, while the instructor (myself) records the lecture (using a feature of the software Teams) and makes it available to students so that they can watch it again and again to better internalize the material. Participants in our research had to meet two conditions: they had to have experienced the shift from TL to DL, and they had to have done so in the same semester. Group C did not make this shift, they only had TL classes. They were in turn asked to base their answers on prior experience with DL classes.

The first section of the questionnaire focuses on demographic information such as gender, ethnicity, and place of birth. This part was used in the analysis of the results.

The second section focused on DL tools. For example, "What do you think of a Teams class, used for these online classes?". The third section covers DL effectiveness, and it includes 10 statements covering technical difficulties, transition, the internet, and the plan of embracing DL. In this section of the questionnaire, I employed a five-point Likert scale to measure the level of agreement (5 = strongly agree, 4 = agree, 3 = neutral, 2 = disagree, and 1 = strongly disagree). The fourth section discusses the most critical dimension of DL vs TL. In this section, there is a total of 24 statements ranging from understanding the theoretical and practical subject matter, ease of sharing information between teacher and students, ease of giving feedback during learning, ease of interacting with students, ease a teacher to recognize student ability and knowledge, development of communication, teamwork, decision making, and problem-solving skills, the efficacy of evaluation, self-confidence, and learning environment. In this section of the questionnaire, I employed a six-point Likert scale to measure the level of agreement (DL is definitely better; DL is comparatively better; Both are equal; TL is comparatively better; TL is definitely better). The questionnaire concluded with three open-ended questions for undergraduates to share their thoughts on DL's benefits, drawbacks, and opportunities. I think their open-ended comments improve

the paper's conclusions and provide credence to their survey responses. The questionnaire was based on that of (Mardini & Mah'd, 2022) as mentioned in my research methodology section.

4.3.1 DL Software Usage and Effect

In their research, (Mardini & Mah'd, 2022) find that Microsoft Teams is the most widely used option for providing online classes, followed by Zoom. Within our institution, the use of Teams is mandatory, due to the AVG (General Data Protection Regulation in the Netherlands). Our institution has chosen to work with the Microsoft 365 software, our student data is connected to their MS 365 account and not to other software. Thus to ensure their data is secure we are not allowed to provide (and record) online classes using other tools. I, therefore, decided to ask the students the question, of what their experience with Teams was, during online classes.

And they were able to respond with; Teams works well; Teams does not work well, but I also do not prefer another program; My experiences with other programs are better.



Figure 1A and 1B: Experience with MS Teams (translation included in the appendix)

In the figure above, we see that the greater part considered their experience with Teams as a good experience. 88% of the students prefer Teams over other programs that they might have used. This is a significant majority.

A more important part of the subject software is the software used to assist with the DL classes. In my classes, I use MS OneNote, but most teachers at our institution use PowerPoint, Excel, or other online presentation tools. We, therefore, asked the students what their opinion was about the use of OneNote and if they rather preferred other software.

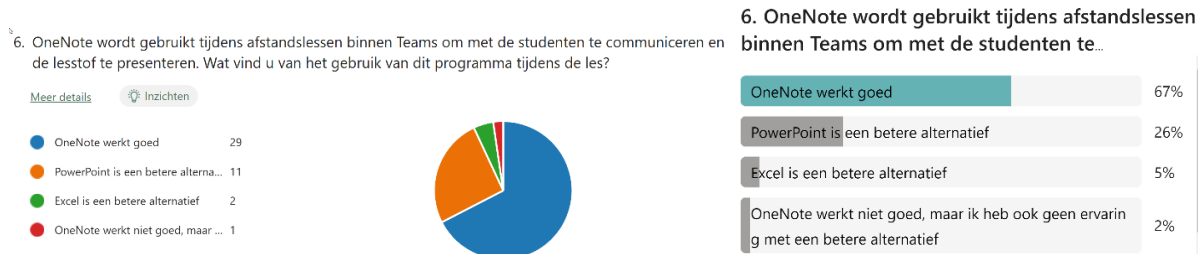


Figure 2A en 2B: (translation included in the appendix)

In the figure above we see that 68% of the students prefer the use of OneNote, the significant majority, 26% feel that PowerPoint is a better alternative and the other 7% either prefer Excel or another not mentioned software. In other research, we see that students from different institutions and countries are interviewed. In these studies (Mardini & Mah'd, 2022) the questions were in the form of; which software do you use? My research is conducted within my institution, within a confined group of students, there was no difference in tools used. Therefore my questions were more aimed at their experience with these tools in comparison to prior used software. The conclusion is that OneNote is the most preferred tool, this can also be seen in the responses to the open questions, where a student states "I prefer that the teacher writes the answers and explanations in OneNote, rather than using Excel". This shows that the usage of the right tools can significantly affect the experience of the student during DL classes.

4.3.2 Transition Process and Dimensions of DL vs. TL

In results related to the transition process and dimensions of DL vs. TL, the 0% line represents the point at which there is no preference for either TL (FO) or DL (AO). The left side of this line represents a preference for TL (FO) and the right side represents a preference for DL (AO). Therefore at moments when referring to the "left" or "right" side, this is a reference to respectively a preference for TL or DL.

4.3.2.1 DL transition

7. Gebaseerd op je ervaring met Afstandsonderwijs (Online lessen), in hoeverre ben je het eens met volgende stellingen?

[Meer details](#)

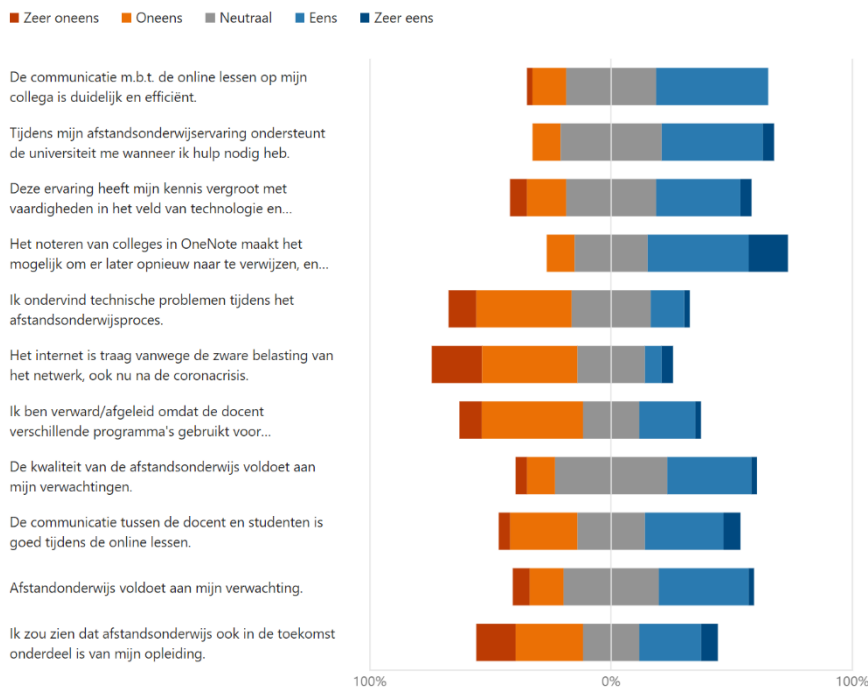


Figure 3: DL Transition (translation included in the appendix)

In the figure above we see the experience of the students related to their DL transition. A few questions show the main difference between the experience that students had during the Covid-19 pandemic, in comparison with the experience after the Covid-19 pandemic. Students, in general, do not experience technical issues, an important part of the experience (Adnan & Anwar, 2020); (Sangster, Stoner, & Flood, 2020). Slow internet, caused by the heavy load on the internet during the massive “work from home policies” that were in place during the Covid-19 pandemic, is something that will affect the experience of the DL classes (Currie & Courduff, 2015). (Fogarty, 2020) and (O’Connel, Tharapos, De Lange, & Beatson, 2022) mention that it is important to resolve any technical issue beforehand, When during the Covid-19 pandemic there was most definitely a case of sudden transfer from TL to DL as (Adnan and Anwar (2020)), this was not the case during this study. This is seen in the answers, which show a generally positive experience. The DL classes in general met the

expectation that the students had of DL. This also shows us one contradiction, namely the answer to the question of whether they would want to see DL classes in their future classes. The majority (44%) disagrees or strongly disagrees with this, a large part (23%) is neutral and a slightly larger part (33%) agree or strongly agree with this. This does not seem in line with the answers related to their expectations of the DL classes, both related to the quality, as well as the general perception. The responses indicate a greater preference for DL (between 37% and 39%) vs. TL (between 16% and 21%), which might have raised the expectation that a greater number of students would prefer DL to be part of their future classes.

4.3.2.2 Course content

8. Dimensie 1: Lesinhoud

[Meer details](#)

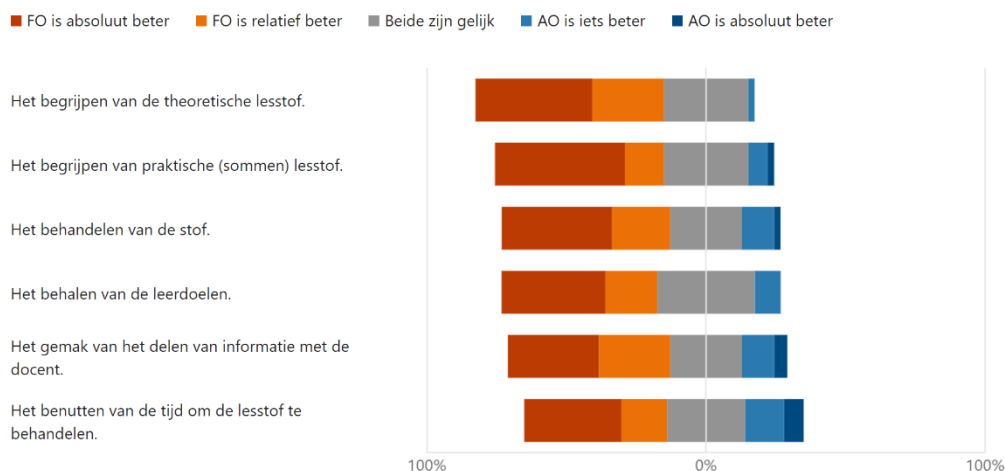


Figure 4: Course content (translation included in the appendix)

Based on previous studies, especially focusing on the method used by (Mardini & Mah'd, 2022), I included six research statements to gauge students' perspectives on distance learning (DL) versus traditional learning (TL) concerning course content. It's important to note that, in fields like accounting and business studies, both theoretical and practical content exist, so I slightly adjusted prior developed statements for each content type (Mayer & Moreno, 2003). (Tharapos, 2021) mentioned that some educators lacked the

necessary skills and experience to redesign and invigorate accounting courses during the pandemic. Limited resources, fear of failure, and pressure to produce research outputs were cited as reasons for educators not innovating their course content.

As depicted in Figure 4, as expected, the students generally prefer TL when it comes to their understanding of content. The mean score leans mostly left from the 0% line, indicating a strong preference for TL. In our result overview This finding aligns with previous research (e.g., Elhaty et al., 2020; Sangster et al., 2020), which has identified challenges in delivering practical courses through DL and highlighted the lack of effectiveness in achieving learning outcomes. However, these findings contradict other studies, such as (Arkorful & Abaidoo, 2015), who suggested that DL contributes to the educational environment by offering flexibility in terms of time and location, thereby improving understanding of course content. The responses to the last two questions, related to the sharing of information and usage of time related to the course content show a higher mean. This is more in line with (Arkorful & Abaidoo, 2015). (Tharapos, 2021) emphasized that institutions should recognize the importance of developing and maintaining course content during times of crisis, including the adoption of innovative learning and teaching methodologies.

A student said, "I am not afraid to ask questions, because I am not in the classroom, behind the screen I dare to ask more questions. It is a safe environment". While another student said, "I am less motivated and I am easier distracted". When reading these open statements it is difficult to create a general view of the students' perception. But when looking at the responses about their preference between TL and DL, this does correspond with prior research.

For example, (Sangster, Stoner, & Flood, 2020) argued that accounting, unlike theoretical subjects, relies on both quantitative and qualitative questions, and (Elhaty, Elhadary, El Gamil, & Kilic, 2020) noted a significant difference between teaching theoretical and practical courses online during the COVID-19 crisis.

In terms of sharing course content by the instructor, and utilizing lecture time to cover the content, respondents prefer TL. But this preference is less than, with a question related to understanding the content and applying it. This is in line with previous research, such as (Draus, Curran, & Trempus, 2014), who found that TL and face-to-face learning are more effective than DL in achieving course learning outcomes. (Tharapos, 2021) also highlighted the need for faculty training in course content development and delivery, which requires substantial time and impacts learning outcomes. (Sangster, Stoner, & Flood, 2020) supported this idea and confirmed that the teaching and learning environment is affected in DL mode.

In conclusion, based on the above discussion, it is evident that students generally favor TL over DL in terms of course content.

4.3.2.3 Interaction

9. Dimensie 2: Interactie

[Meer details](#)

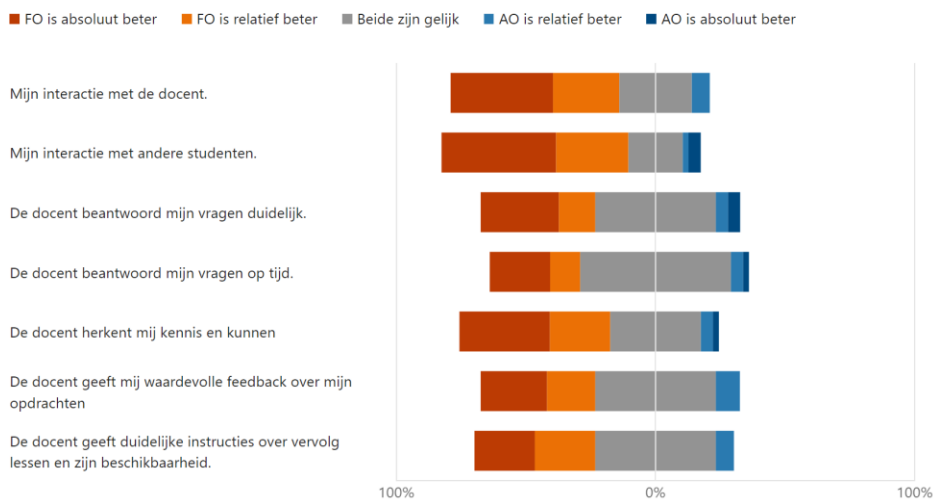


Figure 5: Interaction (translation included in the appendix)

The study of ((Lenert & Janes, 2017); (Mandernach, 2009) suggests that distance learning (DL) can be a highly beneficial tool for students to showcase their abilities, skills, and class participation. On the other hand, other researchers have found that the absence of social (face-to-face) interaction between students and instructors negatively impacts their

learning environment and habits ((Ali & Narayan, 2020); (Beatson, De Lange, O'Connell, Tharapos, & Smith, 2021); (O'Connell, Tharapos, De Lange, & Beatson, 2022).

To test these findings within my groups I formulated the statements in Figure 5, here above. However, my findings differ from previous studies as students generally favor TL over DL in terms of interaction on every statement. This is determined by the mean of the responses that are mostly on the left side of the 0% line. This is an expected finding, especially at my institution (Albeda), which is an institution that provides secondary/intermediate vocational education in the Netherlands (MBO). This type of education is more oriented on the practical side of education, therefore the students, in general, have a preference for traditional education that is considered more practical and less theoretical. Figure 5 reveals that respondents are dissatisfied with the level of interaction in the DL environment, with an average mean score significantly more left of the 0% line.

This supports the notion that TL is comparatively better for interacting with instructors, and fellow students, and seeking clarification on questions. These findings align with Swanson et al. (2015), who observed that DL students often encounter challenges in communication and socialization due to the absence of face-to-face interaction.

Ali et al. (2020) also emphasized the existence of various challenges in engaging students in online learning, particularly in terms of interaction, highlighting the difficulty of transitioning from face-to-face to online environments. However, (Mandernach, 2009) argued that interaction in DL delivery mode helps enhance engagement and identify students' capabilities and skills. These findings contradict the results of (Hussin, Harun, & Shukor, 2019) and (Sangster, Stoner, & Flood, 2020), who found that the DL environment fosters more questions and collaborative learning activities compared to TL.

In response to open-ended questions, we can then again use one of the expressions of a student that responded with the following, "I feel more comfortable using DL to ask questions of the professors than in a physical classroom". This is most probably related to the fear of seeming not intelligent in front of the other student, which is less perceived during an online class (DL).

The other responses are consistent with previous studies that identified the lack of interaction as one of the disadvantages of DL (Arkorful & Abaidoo, 2015); (Draus, Curran, &

Trempus, 2014). (Adnan & Anwar, 2020) further noted that the insufficient interaction between students and instructors is a major concern associated with online learning. However, there are contrasting perspectives that do not align with my findings. For instance, (Hussin, Harun, & Shukor, 2019) asserted that online education can promote active interaction and create a collaborative learning environment.

Lastly, in response to the question about the instructor's response time, it is considered by the greater majority (58,1%) as equal in both DL and TL, with a slight preference for TL of 34,9% and a slight preference for DL of 7%. This is the statement with the mean closest to the 0% line (indication of no preference for either DL or TL). This finding is not completely in line with the findings of (Adnan & Anwar, 2020) as it shows that the preference for TL is as significant as it is for other statements related to the interaction Dimension.

4.3.2.4 Skills

10. Dimensie 3: Vaardigheden

[Meer details](#)

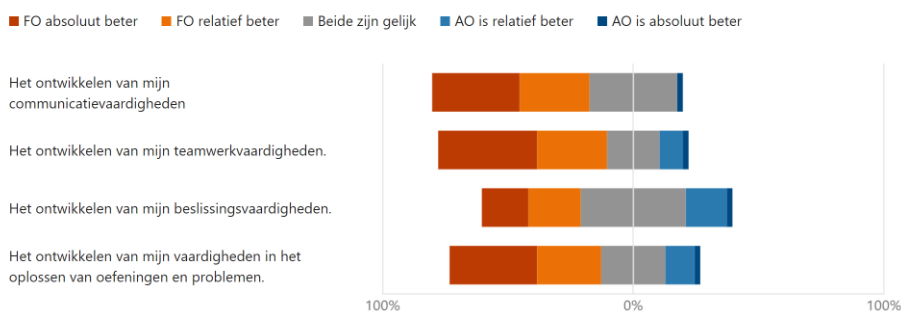


Figure 6: Skills (translation included in the appendix)

I have also focused on the skills that students acquire during these Accounting Classes and I also based this on previous research. I have focused on the four most commonly identified skills, Figure 6, necessary for achieving learning outcomes in accounting and business studies (Sargent, Brothick, & Lederberg, 2011); (Zhang, Zhou, Briggs, & Nunamaker Jr., 2006); (Zhu & Fleming, 2017). For each skill, in Figure 6, I have formulated statements that have yielded the expected results. Overall, the average mean in Figure 6 is significantly left

from the 0% line (indication of no preference for either DL or TL), supporting the claim that "TL is relatively better" in terms of acquiring the required skills. This finding aligns with earlier studies emphasizing that TL offers better opportunities for skill development (Arkorful & Abaidoo, 2015); (Draus, Curran, & Trempus, 2014).

Figure 6 also presents noteworthy outcomes concerning each skill/statement. For example, when related to the statement "Developing my decision skills" has a mean considerably closer to the 0% line (indication of no preference for either DL or TL), which shows that even though most students consider the acquiring of skills to be better through traditional learning, there might also be skills that can also be acquired from distance learning. In general, these results do contradict prior research, which suggested that adopting DL as an (emergency) remote teaching method provides an opportunity for students to enhance their professional and technical skills in terms of self-development (McGuigan, 2021); (O'Connel, Tharapos, De Lange, & Beatson, 2022).

(McGuigan, 2021) regarded the pandemic as an opportunity that fosters students' self-independence and raises their awareness of self-development capabilities. According to (McGuigan, 2021), this creates a self-learning environment among students, enhancing their professional skills (O'Connel, Tharapos, De Lange, & Beatson, 2022). However, some earlier literature argued that this outcome is dependent on the mode of DL delivery, whether synchronous (chat) or asynchronous (discussion board) (Duncan, Kenworthy, & McNamara, 2012); (McBrien, Cheng, & Jones, 2009). For instance, (McBrien, Cheng, & Jones, 2009) discovered that students using synchronous-mode DL are satisfied with the quality of education, while (Duncan, Kenworthy, & McNamara, 2012) found that the synchronous mode improves overall course performance. During my study, both forms were offered, but only the synchronous form was used by the educator because it was the only form that could be measured during my research. Within the OneNote tool, used during the synchronous mode of DL, the students were offered the possibility to make use of the asynchronous mode within the OneNote tool. However, this tool was not used enough to have had an impact on their ability to acquire the aforementioned skills.

Contrary to the results obtained from the interaction dimensions, respondents from all groups agree that "TL is better" in terms of developing teamwork skills, with the only exception being the "decision-making skills", where the agreement that "TL is better" is not as strong. Furthermore, this research is conducted in a situation after the Covid pandemic, in which DL was not the default form as it was during the pandemic. The differences between my research and prior research, mainly those conducted during or shortly after Covid pandemic, can be attributed to the impact of social distancing measures during the pandemic, which limited human contact and social expression and that was not the case during my study. The study by (Robinson & Hullinger, Robinson, C. C., & Hullinger, H. (2008).) who found that teamwork skills improve through online interaction and discussion among instructors and students, is also not in line with my findings. Students indicate that "TL is better" also when acquiring teamwork skills. On the other hand, a significant part of the students believe that their decision-making skills are enhanced in the DL environment, with a mean value closer to the 0% line (indication of no preference for either DL or TL), but still not indicating that DL is better. This observation has been supported in the literature, as students in the DL environment face less pressure and have access to various resources and materials, including recordings (Duncan, Kenworthy, & McNamara, 2012); (Swanson, et al., 2015). Access to various resources and materials was also present during my study, where students had access to recordings, notes, and relevant external material, further supporting that decision-making skills can be enhanced by distance learning.

Lastly, the results for the final skill, developing problem and exercise-solving skills, align with my findings for the course content dimension. During the pandemic, students faced challenges in comprehending the practical content of the course in distance learning classes. This is closely related to the skill of problem and exercise solving, which based on the responses of the students has not improved, even in a situation where DL classes are a small part of their overall classes. This is in line with previous studies that have highlighted the struggles faced by business and economics students in passing courses due to the adverse effects of DL on the development of problem-solving skills (Arkorful & Abaidoo, 2015); (Draus, Curran, & Trempus, 2014); (Swanson, et al., 2015).

4.3.2.5 Performance Evaluation

11. Dimensie 4: Prestatie-evaluatie

[Meer details](#)

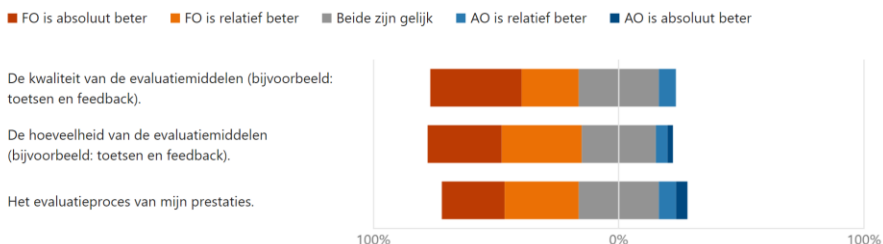


Figure 7: Performance Evaluation (translation included in the appendix)

Previous research has discovered that DL has the potential to improve the quality and quantity of assessment tools (Sargent, Brothick, & Lederberg, 2011). In my study, most respondents across all groups agree that "TL is relatively better" when it comes to the quality, quantity, and process of evaluating their performance. Specifically, Figure 7 illustrates that the statements related to performance evaluation fall below the midpoint value of 0% (on average, indicating that "TL is relatively better"), although there are slight variations among the students. (Fogarty, 2020)) and (White, 2021) point out that cheating has become a prevalent issue in DL during emergency remote teaching, which adversely affects the assessment process and compromises fairness and integrity during the COVID-19 era. (Fogarty, 2020) discovered significant changes and modifications in the assessment tools when designing accounting courses, which hurt both the assessment tools and the performance evaluation process. This is one of the reasons that in my decision I choose to use traditional exams as a tool to assess performance. This made cheating neither less nor more difficult than it was before the emergency remote teaching situation caused by the COVID-19 pandemic.

Nevertheless, findings suggest that students, in a period that can be considered post-COVID-19 pandemic, feel that their performance is not being adequately evaluated. Considering the tools used to evaluate their performance are equal to those before the COVID-19 pandemic, a time when traditional learning was the default and the norm. This

might indicate either a misinterpretation of the questions or an expectation of an adjusted assessment tool that would be more in line with DL than with TL. This is because the classes were for a part in DL form. Some prior literature argues that the evaluation process can be enhanced through online learning. For instance, (Sangster, Stoner, & Flood, 2020) discussed the potential advantages of transitioning from a traditional closed-book assessment format to an open-book format. To not advantage or disadvantage any other groups, not part of this study but following the same classes within the institution, I chose to not deviate in terms of assessment tools. I also guarded that the groups that were part of this study had the same access to the time, tools, and information, that all other groups had. As mentioned before the literature also suggests that the mode of DL delivery (synchronous or asynchronous) can influence performance evaluation. This drove me to choose the synchronous mode of DL delivery, to mimic TL in its most important aspect which considered the synchronous presentation of the information. (Perera & Richardson, 2010), for example, found that the quantity of material accessed through asynchronous forums differs from that accessed through synchronous forums, which impacts final examination performance (also see (Duncan, Kenworthy, & McNamara, 2012). Previous research has noted an increase in the number of assessment tools when DL is employed as an emergency remote teaching mode (Fogarty, 2020); (White, 2021). (White, 2021) attributed this to the ease with which students can access online platforms from their homes, as well as the availability of user-friendly websites (such as Socratic and Kahoot) that facilitate the design, delivery, and evaluation process. As said before, to not disadvantage any of the groups (both within the study, as well as others within our institution) I did not change the assessment tools that were used before the COVID-19 pandemic. During the pandemic, the exams for most classes proceeded in the same way, with very few exceptions. The use of DL assessment tools, mostly existing in asynchronous form, did get a boost during the COVID-19 pandemic within our institution. The continued use differs from course to course, therefore a study into this subject might have attributed to this study.

Consequently, I do believe that the perceptions of these students who have been exposed to DL for the first time after the COVID-19 pandemic can validate and expand upon the

findings of previous studies. It is a closed study, but it applies to a great number of the total student number in the Netherlands. This allows for further generalizations, considering that the global pandemic impacted the global perspectives on DL performance evaluation, including its quantity and quality. The necessity of implementing performance-oriented programs or software to support accounting students' access to appropriate higher-education performance evaluation schemes, has increased even though we are not in the same emergency status as we were during the COVID-19 pandemic.

4.3.2.6 Facilities and other criteria

12. Dimensie 5: Middelen en overige zaken

[Meer details](#)

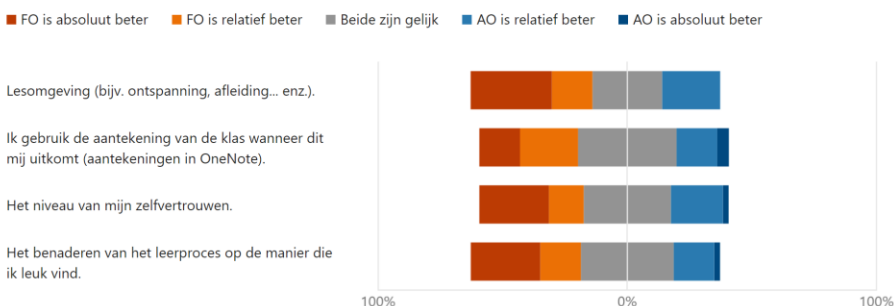


Figure 8: Facilities and other criteria (translation included in the appendix)

Other than the sudden transition from traditional learning (TL) to distance learning (DL), which according to (Adnan & Anwar, 2020) presented numerous challenges and brought about a completely different learning experience in higher education (also see Sangster et al., 2020). In my study, I found interesting results when considering facilities and other criteria as a whole, which are in slight contrast with the previous dimensions. The mean is not as far left from the 0% line (the 0% line is an indication of no preference for either DL or TL) as it was for the other dimensions. This indicates that when looking at the statements for the dimension Facilities and other criteria, for all statements with the exemption of the statement related to Lecture Environment (Figure 8, first statement), we see that the greatest number of the students do not have a preference for either TL or DL

(over 34%). This being an institution that provides vocational education, the students tend to prefer a more practical approach that translates to a preference for traditional education shown in most of the results. This might be one of the main reasons that the findings in my research do not align with the idea that DL fosters the creation of "student-centered learning communities" (Duncan, Kenworthy, & McNamara, 2012). (Duncan, Kenworthy, & McNamara, 2012) suggest that this type of environment promotes co-created learning processes, assuming that the instructor serves as a facilitator rather than solely an information provider. The instructor for Accounting and Business Economics classes, specifically, tends to still hold the "traditional" role of educator rather than a facilitator.

Previous research has also indicated that DL enhances students' self-confidence as it allows them to access lectures from the comfort of their homes (Fogarty, 2020). (Fogarty, 2020) emphasizes that the DL environment offers more flexibility for students, as they can approach their lectures in a way that suits them best, including accessing recordings at different times and from different locations. My study also shows this in the responses both related to the dimension Facilities and other criteria, as well as the statements related to the use of OneNote. Where the students respond mostly not having a preference for DL or TL, and respectively preferring the use of OneNote "because it provides a great way to reread the notes, on your own time".

(McBrien, Cheng, & Jones, 2009) explain that while this learning process is challenging in TL, it becomes even more challenging in DL. My study shows that for Accounting classes in vocational education, this is especially true, the need for traditional education methods is still very present within these students. Some prior studies argue that distractions caused by both students and instructors present a challenge for the DL process, negatively impacting the learning atmosphere and students' willingness to watch (and re-watch) recordings (Fogarty, 2020). This could be attributed to the fact that DL was adopted as a response to the new situation of emergency remote learning, which has affected both the lecture atmosphere and students' perceptions (Fogarty, 2020). In my specific study, this was one of the aspects of DL that had the most varied responses. An aspect that is highlighted with open responses to the "Open Questions".

Some scholars argue that the positive views of DL during the COVID-19 pandemic can help overcome many barriers to online learning or, at the very least, reduce resistance to using technology for education delivery (Sangster, Stoner, & Flood, 2020). My results are not completely consistent with previous studies, that have found that students feel more relaxed, have a richer learning experience, possess greater knowledge, and feel more confident and satisfied when studying from home (Draus, Curran, & Trempus, 2014); (Griffiths & Graham, 2009). Instead, it indicates an acceptance of DL in some aspects, but with a significant preference for TL in most.

4.3.3 Open Questions



Figure 9: Open Questions (translation included in the appendix)

The responses to these questions vary from very positive about DL to "Online education has ruined my student and social life, and has taken away my motivation" McBrien et al. (2009) explain that while a learning process is challenging in TL, it becomes even more challenging in DL. My study shows that for Accounting classes in vocational education, this is especially true. Some prior studies argue that distractions caused by both

students and instructors present a challenge for the DL process, negatively impacting the learning atmosphere and students' willingness to watch (and re-watch) recordings (Fogarty, 2020). This could be attributed to the fact that DL was adopted as a response to the new situation of emergency remote learning, which has affected both the lecture atmosphere and students' perceptions (Fogarty, 2020).

In my specific study, this was one of the aspects of DL that had the most varied responses.

A few examples of student responses that had a positive experience with DL are: "It's flexible, you can easily contact the teacher, you can access the notes directly", "If you're ill you are still able to participate, there might not be a need to miss your class", "There is no need to travel, classes could essentially be followed from your bed".

A few examples of student responses that a less positive or even negative experience with are: "More difficult to understand the subject online", "You are easier distracted. It is more difficult to concentrate", and "There is less social interaction".

5. Conclusion

The transition to DL during the COVID-19 pandemic, known as emergency remote teaching, has been a topic of investigation. The transition process to emergency remote teaching has been generally effective across all countries (Mardini & Mah'd, 2022), ensuring the continuation of the educational process (Fogarty, 2020). However, I sought to understand the views of students regarding DL compared to TL after the COVID-19 pandemic. My findings indicate that, overall, students are not entirely satisfied with DL, they have a preference for TL, especially for their Accounting and Economics classes. In one of the personal interviews with students one had the following statement: “Theoretical classes that are given, using PowerPoint presentations, can easily be followed online. But Accounting and Business Economics that require the teacher to explain a formula or situation multiple times, I prefer in a traditional classroom setting”.

DL has been recognized for its numerous advantages, especially during the pandemic. It has contributed to space-saving, reduced infrastructure costs, and minimized travel-related risks and traffic (Fogarty, 2020). Instructors, although not entirely thrilled with this new educational method, believe that it can still deliver the educational message effectively (Sangster, Stoner, & Flood, 2020).

Interestingly, my results highlight differences in knowledge acquisition between theoretical and practical courses in DL. We conclude that DL may be more effective for theoretical courses in the future while facing challenges in delivering practical courses (Duncan, Kenworthy, & McNamara, 2012); (McBrien, Cheng, & Jones, 2009). It is worth noting that my research focused on students studying through the synchronous mode, but some researchers suggest that the effectiveness may vary depending on the type of DL mode (synchronous or asynchronous) and its impact on students' overall performance (Draus, Curran, & Trempus, 2014).

One area of concern raised by students is the evaluation process. The results indicate that students are dissatisfied with the way they are evaluated. Effective course assessment and

the implementation of various specifications to protect academic integrity are crucial (Sangster, Stoner, & Flood, 2020). This is something I acknowledge, however, despite the perception of the students about DL, their results and improvements do not show a significant difference that can be related to having followed either DL or TL classes. The only significant difference in the result was among the B and the C group, concerning Exam 1. Before taking the exam both groups followed the same TL classes and considering there was no significant difference between these groups and Group A, which did have the DL classes, we must conclude that the differences were caused by other external factors. Albeda College, as mentioned in my introduction, is a great advocate of distance learning as an additional learning method to the existing traditional learning methods. This. The results of my study might motivate this institution to conduct a larger scale study, in which not only Accounting classes are part of the study but a wider range of classes, courses, and studies. Accounting and Economic classes, in my opinion, are not necessarily the subjects best suited for DL classes at the vocational education level because of the different needs related to these classes, as expressed by the students. With the findings showing that there is no significant difference in either the results or improvements, between the groups, further research could be done to determine the effect of DL on either the classes and/or students.

Universities should invest more in enhancing technology skills and knowledge among both instructors and students (Fogarty, 2020). Technology skills are especially important in our ever-digitalizing world. Great tools can only be used correctly if both educator and student are informed and instructed in their usage.

The COVID-19 pandemic has significantly influenced higher education, posing challenges to communication, socialization, and the adoption of DL. Students encountering DL for the first time often experience confusion and struggle with the lack of interaction between students and instructors (Sangster, Stoner, & Flood, 2020). It is essential to address these challenges and enhance the student experience in DL environments, especially when the results show that the student's perceptions and experiences have not changed much even after the COVID-19 pandemic. A situation in which these were one of very few DL classes.

This research provides practical implications in a global context. It contributes to the understanding of DL's impact on accounting education after the COVID-19 pandemic, especially focusing on vocational education and the methods used to provide Accounting classes in DL. As mentioned before, colleges can benefit from the insights and recommendations provided, to either perform further studies or slowly implements (parts of) it into their educational system. DL offers opportunities for students to develop technology skills while reducing operating costs. However, it is important to recognize that in the long term, DL may have negative implications for students' skills and learning outcomes (Sangster, Stoner, & Flood, 2020). Therefore the recommendation, based on the results of this study, is to not replace TL with DL but to combine them where possible and preferred to provide quality education.

I acknowledge the limitations of my research. I focused on a very specific group of accounting students, to have a controlled environment. This in turn limited the demographic differences between the student and groups, which are often related to related to student performance. Limiting it to one teacher, myself, did give me full control of the methods used and ensured the experience was the same across all groups. Again this limited the ability to gain feedback from other teachers about their experience. Future research could address these limitations by targeting groups spread over different locations with different teachers, to have findings that are wider applicable. Furthermore, expanding the study to include more colleges, and possibly even other countries will offer a broader perspective on DL's impact.

In conclusion, while DL has its advantages, our findings suggest that TL continues to hold a preference, particularly for practical courses. The COVID-19 pandemic has brought about significant changes in education, necessitating a thorough examination of educational methods. By addressing the challenges and limitations of DL, we can ensure a balanced approach to education in the future.

Appendix

Data



Data - DL vs TL

Data Analysis (excluding participants that did not take both exams)

```
. oneway Improvement Group, tabulate
```

Group	Summary of Improvement		
	Mean	Std. dev.	Freq.
Group A	1.44	1.8933803	10
Group B	.84545455	.71883745	11
Group C	1.6777778	1.895902	9
Total	1.2933333	1.5529579	30

Source	Analysis of variance			F	Prob > F
	SS	df	MS		
Between groups	3.75183838	2	1.87591919	0.77	0.4750
Within groups	66.1868283	27	2.45136401		
Total	69.9386667	29	2.41167816		

Bartlett's equal-variances test: $\chi^2(2) = 8.6547$ Prob> $\chi^2 = 0.013$

Figure 1: ANOVA Results of the Three Groups

```
. ttest GroupA == GroupB, unpaired unequal
```

Two-sample t test with unequal variances

Variable	Obs	Mean	Std. err.	Std. dev.	[95% conf. interval]	
GroupA	10	1.44	.5987394	1.89338	.0855573	2.794443
GroupB	11	.8454545	.2167376	.7188374	.362533	1.328376
Combined	21	1.128571	.3058277	1.401479	.4906259	1.766517
diff		.5945455	.6367606		-.8018748	1.990966

diff = mean(GroupA) - mean(GroupB) t = 0.9337
H0: diff = 0 Satterthwaite's degrees of freedom = 11.338
Ha: diff < 0 Ha: diff != 0 Ha: diff > 0
Pr(T < t) = 0.8150 Pr(|T| > |t|) = 0.3699 Pr(T > t) = 0.1850

Figure 2: T-Test Between Group A and B

```
. ttest GroupA == GroupC, unpaired unequal
```

Two-sample t test with unequal variances

Variable	Obs	Mean	Std. err.	Std. dev.	[95% conf. interval]	
GroupA	10	1.44	.5987394	1.89338	.0855573	2.794443
GroupC	9	1.6777778	.6319673	1.895902	.2204585	3.135097
Combined	19	1.552632	.4233236	1.845225	.6632618	2.442001
diff		-.2377778	.8705582		-2.076283	1.600727

diff = mean(GroupA) - mean(GroupC) t = -0.2731
H0: diff = 0 Satterthwaite's degrees of freedom = 16.7857
Ha: diff < 0 Ha: diff != 0 Ha: diff > 0
Pr(T < t) = 0.3940 Pr(|T| > |t|) = 0.7881 Pr(T > t) = 0.6060

Figure 3: T-Test Between Group A and C

```
. ttest GroupB == GroupC, unpaired unequal
```

Two-sample t test with unequal variances

Variable	Obs	Mean	Std. err.	Std. dev.	[95% conf. interval]	
GroupB	11	.8454545	.2167376	.7188374	.362533	1.328376
GroupC	9	1.677778	.6319673	1.895902	.2204585	3.135097
Combined	20	1.22	.3135199	1.402104	.5637953	1.876205
diff		-.8323232	.6681002		-2.323331	.6586848

diff = mean(GroupB) - mean(GroupC) t = -1.2458
H0: diff = 0 Satterthwaite's degrees of freedom = 9.88321

Ha: diff < 0 Ha: diff != 0 Ha: diff > 0
Pr(T < t) = 0.1208 Pr(|T| > |t|) = 0.2416 Pr(T > t) = 0.8792

Figure 4: T-Test Between Group B and C

```
. oneway Improvement Gender, tabulate
```

Gender	Summary of Improvement		
	Mean	Std. dev.	Freq.
Female	1.0375	.56045262	8
Male	1.5736842	1.6759217	19
Not answe..	.2	2.4062419	3
Total	1.2933333	1.5529579	30

Analysis of variance					
Source	SS	df	MS	F	Prob > F
Between groups	5.60307456	2	2.80153728	1.18	0.3239
Within groups	64.3355921	27	2.38279971		
Total	69.9386667	29	2.41167816		

Bartlett's equal-variances test: chi2(2) = 8.5102 Prob>chi2 = 0.014

Figure 5: Gender

```
. oneway Improvement Ethnicity, tabulate
```

Ethnicity	Summary of Improvement		
	Mean	Std. dev.	Freq.
Dutch;	1.6538462	1.4773938	13
Dutch;Non-Dut..	1.45	.07071068	2
Non-Dutch;	1.15	1.5547581	12
Not answered	.2	2.4062419	3
Total	1.2933333	1.5529579	30

Analysis of variance					
Source	SS	df	MS	F	Prob > F
Between groups	5.57135897	3	1.85711966	0.75	0.5322
Within groups	64.3673077	26	2.47566568		
Total	69.9386667	29	2.41167816		

Bartlett's equal-variances test: chi2(3) = 5.3138 Prob>chi2 = 0.150

Figure 6: Ethnicity

```
. oneway Improvement Birthplace, tabulate
```

Birthplace	Summary of Improvement		
	Mean	Std. dev.	Freq.
Netherlands	1.3304348	1.5304292	23
Not answered	.2	2.4062419	3
Other than the Netherlands..	1.9	.76157731	4
Total	1.2933333	1.5529579	30

Analysis of variance					
Source	SS	df	MS	F	Prob > F
Between groups	5.08997101	2	2.54498551	1.06	0.3606
Within groups	64.8486957	27	2.40180354		
Total	69.9386667	29	2.41167816		

Bartlett's equal-variances test: chi2(2) = 2.6798 Prob>chi2 = 0.262

Figure 7: Birthplace

```
. oneway Improvement Followedonlineclassesfromhom, tabulate
```

Followed online classes from home?	Summary of Improvement		
	Mean	Std. dev.	Freq.
Not answered..	.2	2.4062419	3
Yes, at home..	1.4148148	1.4461364	27
Total	1.2933333	1.5529579	30

Source	Analysis of variance			F	Prob > F
	SS	df	MS		
Between groups	3.98459259	1	3.98459259	1.69	0.2040
Within groups	65.9540741	28	2.35550265		
Total	69.9386667	29	2.41167816		

Bartlett's equal-variances test: chi2(1) = 1.1085 Prob>chi2 = 0.292

Questionnaire responds summary

Afstandsonderwijs vs Fysiekonderwijs

43

Antwoorden

10:09

Gemiddelde tijd om te voltooien

Actief

Status

1. Waar bent u geboren?

● Nederland	38
● Ander land	5
● Ik wil dit liever niet vermelden	0



2. Wat is uw geslacht?

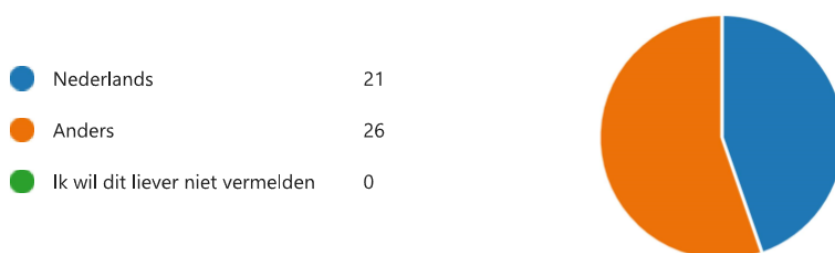
● Man	27
● Vrouw	16
● Ik wil dit liever niet vermelden	0



3. Wat is uw huissituatie? Heeft u de mogelijkheid om rustig een online les te volgen?



4. Wat is uw etniciteit/afkomst?



5. Wat vindt u van een les in Teams, die gebruikt in deze klas?

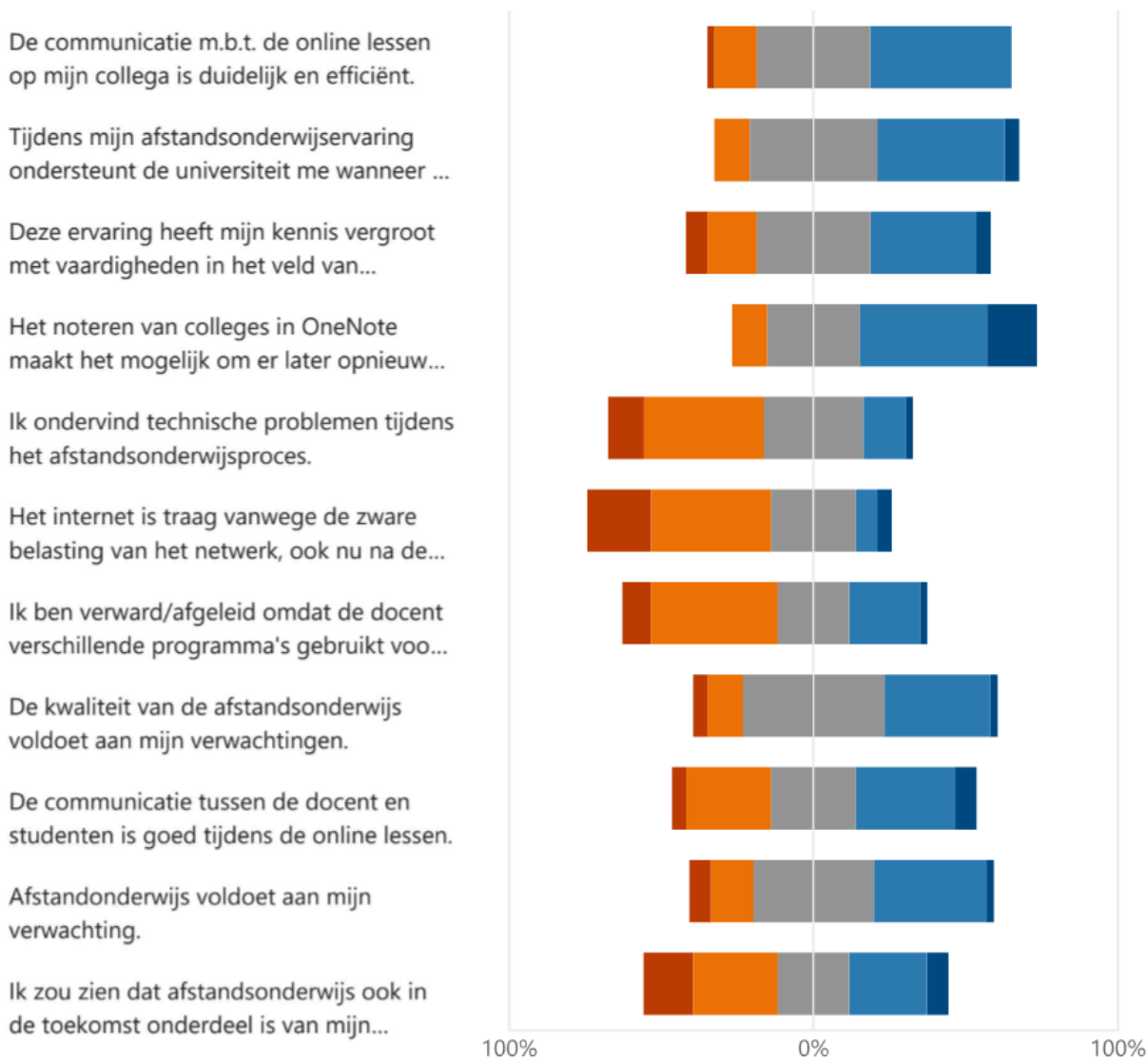


6. OneNote wordt gebruikt tijdens afstandslessen binnen Teams om met de studenten te communiceren en de lesstof te presenteren. Wat vindt u van het gebruik van dit programma tijdens de les?



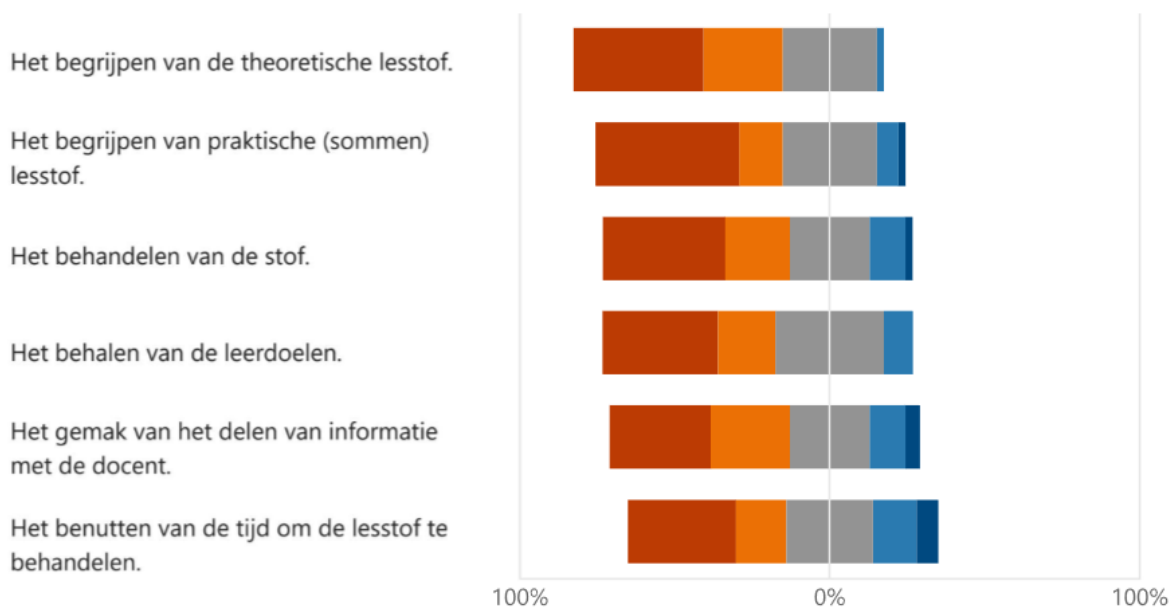
7. Gebaseerd op je ervaring met Afstandsonderwijs (Online lessen), in hoeverre ben je het eens met volgende stellingen?

■ Zeer oneens
 ■ Oneens
 ■ Neutraal
 ■ Eens
 ■ Zeer eens



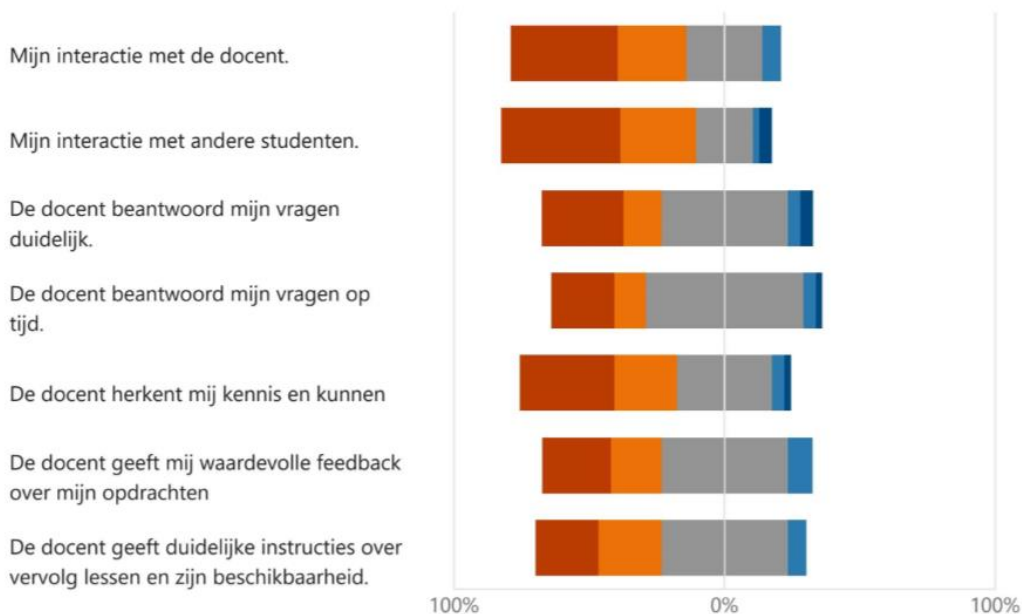
8. Dimensie 1: Lesinhoud

■ FO is absoluut beter
 ■ FO is relatief beter
 ■ Beide zijn gelijk
 ■ AO is iets beter
■ AO is absoluut beter



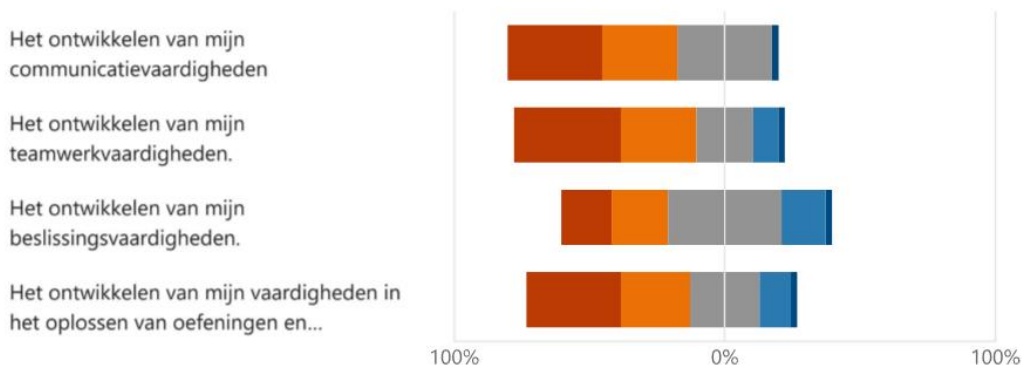
9. Dimensie 2: Interactie

■ FO is absoluut beter
 ■ FO is relatief beter
 ■ Beide zijn gelijk
 ■ AO is relatief beter
■ AO is absoluut beter



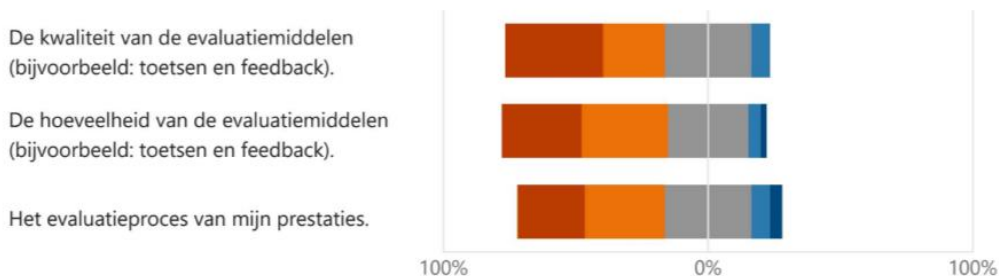
10. Dimensie 3: Vaardigheden

■ FO absoluut beter
 ■ FO relatief beter
 ■ Beide zijn gelijk
 ■ AO is relatief beter
■ AO is absoluut beter



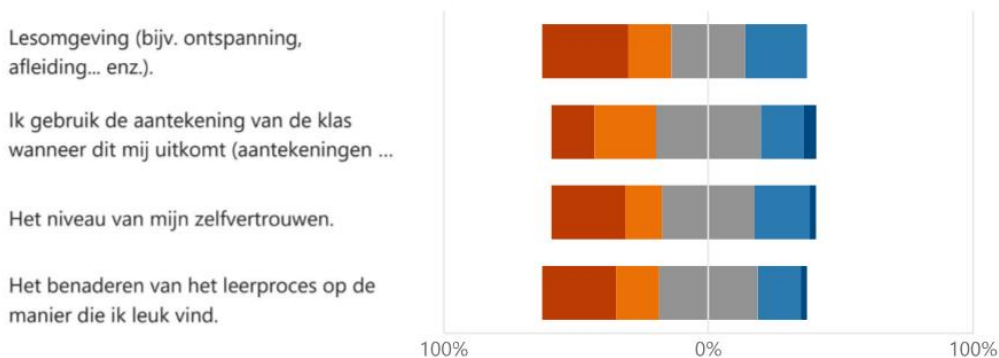
11. Dimensie 4: Prestatie-evaluatie

■ FO is absoluut beter
 ■ FO is relatief beter
 ■ Beide zijn gelijk
 ■ AO is relatief beter
■ AO is absoluut beter



12. Dimensie 5: Middelen en overige zaken

■ FO is absoluut beter
 ■ FO is relatief beter
 ■ Beide zijn gelijk
 ■ AO is relatief beter
■ AO is absoluut beter



13. Gebaseerd op jouw ervaring, geef hieronder 3 voordelen van afstandsonderwijs (online lessen).

43
Antwoorden

Meest recente antwoorden

"Laat zieke mensen meedoen aan lessen, hoeven geen lessen ...

"Het is flexibel, je kan docent makkelijker bereiken, je kan in h...

"Je hoeft niet lang te reizen, Ik let beter op, Ik kan in m'n bed ...

14. Gebaseerd op jouw ervaring, geef hieronder 3 nadelen van afstandsonderwijs (online lessen).

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Antwoorden

Meest recente antwoorden

"Moeilijker te begrijpen onderwerp, lezen van presentatie kan...

"Je bent eerder afgeleid, Je kunt niet optimaal focussen, Je ku...

"Ik ben sneller afgeleid, Je hebt minder sociale contacten "

15. Gebaseerd op jouw ervaring, geef hieronder 3 suggesties over verbeteringen die jouw ervaring met afstandsonderwijs (online lessen) beter zouden maken.

43
Antwoorden

Meest recente antwoorden

"Online beter maken is simpelweg geen online lessen doen, d...

"Nvt"

"Een doel maken voor het eind van de les "

Questionnaire translation

Question in Dutch	Question in English
Wat bent u geboren?	Where were you born?
Wat is uw geslacht?	What is your Gender
Wat is uw huissituatie? Heeft u de mogelijkheid om rustig een online les te volgen?	What is your home situation? Are you able to follow the online classes in peace?
Wat is uw etniciteit/afkomst?	What is your ethnicity/origin?
Wat vind u van een les in Teams, die gebruikt in deze klas?	What do you think of a Teams class, used for these online classes?
OneNote wordt gebruikt tijdens afstandslessen binnen Teams om met de studenten te communiceren en de lesstof te presenteren. Wat vind u van het gebruik van dit programma tijdens de les?	OneNote is used during distance lessons within Teams to communicate with the students and present the lesson material. What do you think of using this program in class?
De communicatie m.b.t. de online lessen op mijn collega is duidelijk en efficiënt.	The communication by the teacher, related to online classes, is clear and efficient
Tijdens mijn afstandsopleiding ondersteunt de universiteit me wanneer ik hulp nodig heb.	During my distance learning experience, the university supports me whenever I need help.
Deze ervaring heeft mijn kennis vergroot met vaardigheden in het veld van technologie en afstandsopleiding	This experience has increased my knowledge with skills in the field of technology and distance learning
Het noteren van colleges in OneNote maakt het mogelijk om er later opnieuw naar te verwijzen, en dit versterkt mijn begrip.	Noting lectures in OneNote makes it possible to refer back to them later, and this strengthens my understanding.
Ik ondervind technische problemen tijdens het afstandsopleidingsproces.	I am experiencing technical difficulties during the distance learning process.
Het internet is traag vanwege de zware belasting van het netwerk, ook nu na de coronacrisis.	The internet is slow due to the heavy load on the network, even now after the corona crisis.
Ik ben verward/afgeleid omdat de docent verschillende programma's gebruikt voor afstandsopleiding dan tijdens de fysieke les!	I am confused/distracted because the teacher uses different programs for distance learning than during the physical class!
De kwaliteit van de afstandsopleiding voldoet aan mijn verwachtingen.	The quality of the distance learning meets my expectations.
De communicatie tussen de docent en studenten is goed tijdens de online lessen.	Communication between the teacher and students is good during the online classes.
Afstandsopleiding voldoet aan mijn verwachting.	Distance learning meets my expectations.
Ik zou zien dat afstandsopleiding ook in de toekomst onderdeel is van mijn opleiding.	I would see distance learning as part of my education in the future as well.
Het begrijpen van de theoretische lesstof.	Understanding the theoretical subject matter.
Het begrijpen van praktische (sommen) lesstof.	Understanding practical (sums) subject matter.
Het behandelen van de stof.	Discussing the subject matter.
Het behalen van de leerdoelen.	Achieving the learning objectives.
Het gemak van het delen van informatie met de docent.	The ease of sharing information with the teacher.
Het benutten van de tijd om de lesstof te behandelen.	Using the available time to cover the subject matters.
Mijn interactie met de docent.	My interaction with the teacher.
Mijn interactie met andere studenten.	My interaction with other students.
De docent beantwoordt mijn vragen duidelijk.	The teacher answered my questions clearly.
De docent beantwoordt mijn vragen op tijd.	The teacher answered my questions on time.
De docent herkent mijn kennis en kunnen	The teacher recognizes my knowledge and ability
De docent geeft mij waardevolle feedback over mijn opdrachten	The teacher gives me valuable feedback on my assignments
De docent geeft duidelijke instructies over vervolg lessen en zijn beschikbaarheid.	The teacher gives clear instructions about follow-up lessons and their availability.
Het ontwikkelen van mijn communicatievaardigheden	Developing my communication skills
Het ontwikkelen van mijn teamwerkvaardigheden.	Developing my teamwork skills.
Het ontwikkelen van mijn beslissingsvaardigheden.	Developing my decision making skills.
Het ontwikkelen van mijn vaardigheden in het oplossen van oefeningen en problemen.	Developing my skills in solving exercises and problems.
De kwaliteit van de evaluatiemiddelen (bijvoorbeeld: toetsen en feedback).	The quality of the evaluation tools (for example: tests and feedback).
De hoeveelheid van de evaluatiemiddelen (bijvoorbeeld: toetsen en feedback).	The quantity of the evaluation resources (for example: tests and feedback).
Het evaluatieproces van mijn prestaties.	The evaluation process of my performance.
Lesomgeving (bijv. ontspanning, afleiding... enz.).	Teaching environment (e.g. relaxation, distraction...etc).
Ik gebruik de aantekening van de klas wanneer dit mij uitkomt (aantekeningen in OneNote).	I use the class annotation when it suits me (notes in OneNote).
Het niveau van mijn zelfvertrouwen.	The level of my self confidence.
Het benaderen van het leerproces op de manier die ik leuk vind.	Approaching the learning process the way I like.
Gebaseerd op jouw ervaring, geef hieronder 3 voordelen van afstandsopleiding (online lessen).	Based on your experience, list below 3 benefits of distance learning (online classes).
Gebaseerd op jouw ervaring, geef hieronder 3 nadelen van afstandsopleiding (online lessen).	Based on your experience, please list 3 disadvantages of distance learning (online classes) below.
Gebaseerd op jouw ervaring, geef hieronder 3 suggesties over verbeteringen die jouw ervaring met afstandsopleiding (online lessen) beter zouden maken.	Based on your experience, please provide below 3 suggestions on improvements that would make your experience with distance learning (online classes) better.

Possible Answers in Dutch	Possible answers in English
Nederland; Ander land	Netherlands; Different country
Man; Vrouw; Wil ik liever niet beantwoorden	Man; Female; Would rather not answer
Ja, dit kan thuis; Ja, dit kan op een andere locatie; Nee, dit kan niet thuis of op een andere locatie	Yes, at home; No, not at home or other location
Nederlands; Anders	Dutch; Non-Dutch
Teams werkt goed; Mijn ervaring met andere programma's (zoals Zoom, Google Classroom) is beter; Teams werkt niet goed, maar ik heb ook geen alternatief	Teams works well; My experience with other programs (like Zoom, Google Classroom) is better; Teams doesn't work well, but I also have no alternative
OneNote werkt goed; PowerPoint is een betere alternatief; Excel is een betere alternatief; OneNote werkt niet goed, maar ik heb ook geen ervaring met een betere alternatief	OneNote works well; PowerPoint is a better alternative; Excel is a better alternative; OneNote doesn't work well, but I don't have experience with a better alternative either
Zeer oneens; oneens; neutraal; eens; zeer eens	Strongly disagree; disagree; neutral; agree; strongly agree
Zeer oneens; oneens; neutraal; eens; zeer eens	Strongly disagree; disagree; neutral; agree; strongly agree
Zeer oneens; oneens; neutraal; eens; zeer eens	Strongly disagree; disagree; neutral; agree; strongly agree
Zeer oneens; oneens; neutraal; eens; zeer eens	Strongly disagree; disagree; neutral; agree; strongly agree
Zeer oneens; oneens; neutraal; eens; zeer eens	Strongly disagree; disagree; neutral; agree; strongly agree
Zeer oneens; oneens; neutraal; eens; zeer eens	Strongly disagree; disagree; neutral; agree; strongly agree
Zeer oneens; oneens; neutraal; eens; zeer eens	Strongly disagree; disagree; neutral; agree; strongly agree
Zeer oneens; oneens; neutraal; eens; zeer eens	Strongly disagree; disagree; neutral; agree; strongly agree
Zeer oneens; oneens; neutraal; eens; zeer eens	Strongly disagree; disagree; neutral; agree; strongly agree
Zeer oneens; oneens; neutraal; eens; zeer eens	Strongly disagree; disagree; neutral; agree; strongly agree
AO is absoluut beter; AO is relatief beter; Beide zijn gelijk; FO is relatief beter; FO is absoluut beter	DL is definitely better; DL is comparatively better; Both are equal; TL is comparatively better; TL is definitely better
AO is absoluut beter; AO is relatief beter; Beide zijn gelijk; FO is relatief beter; FO is absoluut beter	DL is definitely better; DL is comparatively better; Both are equal; TL is comparatively better; TL is definitely better
AO is absoluut beter; AO is relatief beter; Beide zijn gelijk; FO is relatief beter; FO is absoluut beter	DL is definitely better; DL is comparatively better; Both are equal; TL is comparatively better; TL is definitely better
AO is absoluut beter; AO is relatief beter; Beide zijn gelijk; FO is relatief beter; FO is absoluut beter	DL is definitely better; DL is comparatively better; Both are equal; TL is comparatively better; TL is definitely better
AO is absoluut beter; AO is relatief beter; Beide zijn gelijk; FO is relatief beter; FO is absoluut beter	DL is definitely better; DL is comparatively better; Both are equal; TL is comparatively better; TL is definitely better
AO is absoluut beter; AO is relatief beter; Beide zijn gelijk; FO is relatief beter; FO is absoluut beter	DL is definitely better; DL is comparatively better; Both are equal; TL is comparatively better; TL is definitely better
AO is absoluut beter; AO is relatief beter; Beide zijn gelijk; FO is relatief beter; FO is absoluut beter	DL is definitely better; DL is comparatively better; Both are equal; TL is comparatively better; TL is definitely better
AO is absoluut beter; AO is relatief beter; Beide zijn gelijk; FO is relatief beter; FO is absoluut beter	DL is definitely better; DL is comparatively better; Both are equal; TL is comparatively better; TL is definitely better
AO is absoluut beter; AO is relatief beter; Beide zijn gelijk; FO is relatief beter; FO is absoluut beter	DL is definitely better; DL is comparatively better; Both are equal; TL is comparatively better; TL is definitely better
AO is absoluut beter; AO is relatief beter; Beide zijn gelijk; FO is relatief beter; FO is absoluut beter	DL is definitely better; DL is comparatively better; Both are equal; TL is comparatively better; TL is definitely better
AO is absoluut beter; AO is relatief beter; Beide zijn gelijk; FO is relatief beter; FO is absoluut beter	DL is definitely better; DL is comparatively better; Both are equal; TL is comparatively better; TL is definitely better
AO is absoluut beter; AO is relatief beter; Beide zijn gelijk; FO is relatief beter; FO is absoluut beter	DL is definitely better; DL is comparatively better; Both are equal; TL is comparatively better; TL is definitely better
AO is absoluut beter; AO is relatief beter; Beide zijn gelijk; FO is relatief beter; FO is absoluut beter	DL is definitely better; DL is comparatively better; Both are equal; TL is comparatively better; TL is definitely better
AO is absoluut beter; AO is relatief beter; Beide zijn gelijk; FO is relatief beter; FO is absoluut beter	DL is definitely better; DL is comparatively better; Both are equal; TL is comparatively better; TL is definitely better
AO is absoluut beter; AO is relatief beter; Beide zijn gelijk; FO is relatief beter; FO is absoluut beter	DL is definitely better; DL is comparatively better; Both are equal; TL is comparatively better; TL is definitely better
AO is absoluut beter; AO is relatief beter; Beide zijn gelijk; FO is relatief beter; FO is absoluut beter	DL is definitely better; DL is comparatively better; Both are equal; TL is comparatively better; TL is definitely better
AO is absoluut beter; AO is relatief beter; Beide zijn gelijk; FO is relatief beter; FO is absoluut beter	DL is definitely better; DL is comparatively better; Both are equal; TL is comparatively better; TL is definitely better
AO is absoluut beter; AO is relatief beter; Beide zijn gelijk; FO is relatief beter; FO is absoluut beter	DL is definitely better; DL is comparatively better; Both are equal; TL is comparatively better; TL is definitely better
AO is absoluut beter; AO is relatief beter; Beide zijn gelijk; FO is relatief beter; FO is absoluut beter	DL is definitely better; DL is comparatively better; Both are equal; TL is comparatively better; TL is definitely better
AO is absoluut beter; AO is relatief beter; Beide zijn gelijk; FO is relatief beter; FO is absoluut beter	DL is definitely better; DL is comparatively better; Both are equal; TL is comparatively better; TL is definitely better
AO is absoluut beter; AO is relatief beter; Beide zijn gelijk; FO is relatief beter; FO is absoluut beter	DL is definitely better; DL is comparatively better; Both are equal; TL is comparatively better; TL is definitely better
Eigen antwoord	Own answer
Eigen antwoord	Own answer
Eigen antwoord	Own answer

OneNote - Example Class

Les 6 - 13 December 2022

Hoofdstuk 3 Een andere indeling van de kosten

Opdracht 1
Achterhuis Lamps verwacht het komende jaar een omzet van € 500.000,- te realiseren. De variabele kosten worden geschat op € 270.000,- per jaar.

Bereken het constante kostenpercentage voor het komende jaar.

omzet = ck-tarief x c.k.
€ 100.000 x 0,30 = € 30.000

1) $ck\text{-tarief} = \frac{\text{constante k.}}{\text{omzet}}$
ck-tarief = $\frac{€ 270.000}{€ 300.000} = € 0,30$ per euro omzet

Opdracht 2
De verkoopprijs, inclusief btw, van Theater De Buit bevoegd vorig jaar € 1.253,500. De normale prijs, inclusief btw, bedroeg € 1.253,500. De constante kosten werden op € 253.500, geschat. De btw is 6%.

a. Bereken de werkelijke en de normale prijs.

€ 1.253.500 → ex BTW $W.O. = \frac{€ 1.253.500}{1,06} \times 100 = € 1.250.000$
€ 1.253.500 → ex BTW $Norm. = \frac{€ 1.253.500}{1,09} \times 100 = € 1.150.000$

b. Bereken het constante kostenpercentage.

$ck\text{-tarief} = \frac{ck}{\text{normale omzet (ex BTW)}} = \frac{€ 345.000}{€ 1.150.000} = € 0,30$ per euro omzet

c. Bereken het bezettingsresultaat.

$\text{Bezettingresultaat} = (W.O. - N.O.) \times \frac{\text{constante kosten}}{\text{normale omzet}}$
 $W.O. = \text{werkelijke omzet}$ $N.O. = \text{normale omzet}$
 $\text{Bezettingres} = (1.250.000 - 1.150.000) \times \frac{345.000}{1.150.000} = € 30.000$

d. Is hier sprake van een positief of negatief bezettingresultaat? Motiveer je antwoord.
Positief bezettingresultaat, de werkelijke omzet is groter dan de normale omzet.

Opdracht 11
Uitverkoop. Het heeft een normale omzet van € 321.500,-. De constante kosten bedragen € 18.775,-. Er is een bezettingresultaat van € 1.075,-.

Bereken de werkelijke omzet van uitverkoop.

€ 1.075 = (W.O. - € 321.500) x 0,05

$\frac{€ 10}{2} = ? \times 2$ van x naar ÷
 $\frac{10}{2} = ? = 5$
 $\frac{1075}{0,05} = (W.O. - 321.500)$
 $\frac{1075}{0,05} = -€ 21.500$
 $-21.500 = (W.O. - 321.500)$
 $321.500 - 21.500 = W.O.$
 $300.000 = W.O.$

Hoofdstuk 8 Break-even → geen winst, maar ook geen verlies.

Opdracht 1

Opdracht 10
Pablo verkoopt op de lokale poppen voor zijn Scheiding vereniging. De poppen worden verkocht voor € 250 inclusief btw per stuk. De variabele kosten zijn € 200 per stuk poppen. De constante kosten, behalve de afzet van de poppen, bedragen € 250,-.

a. Bereken de break-even omzet.

b. Controleer of er bij de berekende break-even omzet geen winst of verlies is gemaakt.

c. Bereken de omzet als de Scheiding € 1.000,- netto-winst wil maken.

Als je € 1000,- netto-winst wil maken dan moet de dekking niet alleen de constante kosten dekken maar ook de winst. Hiervoor moeten we de BEA formule aanpassen van $BEA = \frac{\text{constante kosten}}{\text{dekking}}$ naar $Afzet = \frac{\text{constante kosten} + \text{winst}}{\text{dekking}}$. Dit betekent dus het volgende: $Afzet = \frac{€ 250 + € 1000}{€ 250 - € 200} = 625$ stuks. Scheiding moet dus 625 stuks verkopen om al zijn kosten te dekken en € 1000,- winst te maken.

Opdracht 22
Computering verkoopt aan verspreiden een cursus "Werk met de computer" voor € 200,- inclusief btw. De variabele kosten bedragen € 200,- per cursus te gek worden er 200 cursussen verkocht. Computering heeft ook een vaste van € 700,-.

- a) Constante kosten per maand = Omzet - Variabele kosten - Winst (bij Winst) of Constante kosten per maand = Omzet - Variabele kosten + Verlies (bij Verlies). Hier is er € 750 verlies geleden, dus 25 opte.
 $€ 6 = € 212.500 - € 170.000 + € 750 = € 48.250$
- e) $BEA = \frac{ck}{\text{dekking}} = \frac{€ 48.250}{€ 50} = 865$ stuks → 2e moeten dus 15 extra verkopen om geen verlies te draaien

Elk productiefabriek 8.000 verspreiden draagapparaten per jaar. De verkoopprijs van een draagapparaat is € 25,-. De variabele kosten zijn € 12,50. De constante kosten die aan de draagapparaten toegevoegd kunnen worden, zijn € 200,-. Bepaal zijn constanten.

a. Bereken de break-even omzet.
 $BEA = \frac{\text{stuks} \times \text{constante kosten}}{\text{dekking}}$

Dekking = Opbrengst - Variabele kosten → om winst te maken en de constante kosten te dekken.
 $\text{Dekking} = € 25 - € 12,50 = € 12,50$ per stuk

$BEA = \frac{€ 200.000}{€ 12,50} = 9600$ stuks. Vanaf 9601 stuks maak ik winst.

b. Bereken de break-even omzet.

$BEO = BEA \times \text{Verkoopprijs}$
 $BEO = 9600 \times 25 = € 240.000$

c. Controleer of er bij de berekende break-even omzet geen winst of verlies is gemaakt.

Omzet/opbrengst	€ 240.000,-
Variabele kosten	€ 120.000,-
Dekking	€ 120.000,-
Constante k.	€ 120.000,-
Winst/verlies	€ 0,-

Opdracht 4
Maurice produceert en verkoopt ledereen tassen voor € 22,- inclusief btw per stuk. De variabele kosten zijn € 12,- per tas. Als Maurice 160.000 tassen fabriceert en verkoopt, maakt er geen winst of verlies.

a. Bereken de dekking bij deze productie.

$\text{Dekking} = \text{Opbrengst} - \text{Variabele kosten}$
 $= 20 - 12 = 8$

b. Bereken de totale constante kosten voor Maurice.

$BEA = 160.000$ stuks
 $BEA = \frac{\text{constante kosten}}{\text{dekking}}$ → $160.000 = \frac{?}{8}$
 $ck = 160.000 \times 8 = ? = € 1.280.000$

Opdracht 10
De verkoopprijs van een tafelmidi is € 20,- incl. btw. De constante kosten bedragen € 1.200.000,- per jaar. De variabele kosten zijn € 4,- per tafelmidi. De break-even omzet is € 1.125.000,-.

a. Bereken de break-even omzet.

$BEA = ?$
 $BEO = BEA \times \text{verkoopprijs}$
 $€ 1.125.000 = ? \times 20$
 $BEA = \frac{\text{constante kosten}}{\text{dekking}}$
 $BEA = \frac{€ 2.500.000}{€ 20 - € 4} = \frac{€ 2.500.000}{16} = 156.250$ stuks

Opdracht 10
Pablo verkoopt op de brederde poppen voor zijn Scheiding vereniging. De poppen

10a) $\text{Dekking} = 250 - 200 = 200$
 $BEA = \frac{ck}{\text{dekking}} = \frac{€ 25000}{€ 200} = 125$ stuks
 $BEO = BEA \times \text{Verkoopprijs}$
 $BEO = 125 \times 250 = € 31250$
omzet (opbrengst) € 312,50
variabele kosten € 62,50 - (125 x € 50)
dekking € 250,00
constante kosten € 250,00
NETTO WINST € 0,00

References

- Adnan, M., & Anwar, K. (2020). Online learning amid the COVID-19 pandemic: Students' perspectives. *Journal of Pedagogical Sociology and Psychology*, 2(1), 45–51.
- Algahtani, A. F. (2011). Evaluating the Effectiveness of the E-learning Experience in Some Universities in Saudi Arabia from Male Students' Perceptions. *Durham theses*. Durham University.
- Ali, I., & Narayan, A. K. (2020). Adapting to COVID-19 disruptions: Student engagement in online learning of accounting. *Accounting Research Journal*, 34(3), 261-269.
- Arkorful, V., & Abaidoo, N. (2015). The role of e-learning, advantages and disadvantages of its adoption in higher education. *Instructional Technology and Distance Learning*, pp. 29–42.
- Basilaia, G., & Kvavadze, D. (2020). Transition to online education in schools during a SARS-CoV-2 coronavirus (COVID-19) pandemic in Georgia. *Pedagogical Research*, 5(4).
- Baumeister, R., & Leary, M. (1995). The need to belong: Desire for interpersonal attachments as a fundamental human motivation. *Psychological Bulletin*, 117(3), 497-529.
- Beatson, N., De Lange, P., O'Connell, B., Tharapos, M., & Smith, J. (2021). Factors impacting on accounting academics' motivation and capacity to adapt in challenging times. *Accounting Research Journal*, 34(2), 184–195.
- Bormans, A., & Damen, F. (2021). *Mbo's gaan ook na corona verder met online onderwijs, tegen de wil van de Kamer*. Retrieved from de Volkskrant: <https://www.volkskrant.nl/nieuws-achtergrond/mbo-s-gaan-ook-na-corona-verder-met-online-onderwijs-tegen-de-wil-van-de-kamer~bb444c4d/?referrer=https%3A%2F%2Fwww.google.com%2F>
- Carnegie, G., Parker, L., & Tsahuridu, E. (2021). It's 2020: What is accounting today? *Australian Accounting Review*, 96(31), 65–73.
- Chen, X., Kashkeli, A., Raza, S., Hakim, F., & Khan, K. (2022). Factors affecting readiness to diffuse blended learning in Pakistani higher education institutions. *International Journal of Educational Management*, Vol. 36 No. 6, pp. 1080-1095.
- Currie, K., & Courduff, J. (2015). Augmented Reality. *Instructional Technology*, 17.
- De Boer, H. (2021). COVID-19 in Dutch higher education. *STUDIES IN HIGHER EDUCATION*, 46(1), 96-106.
- Draus, P., Curran, M., & Trempus, M. (2014). The influence of instructor-generated video content on student satisfaction with and engagement in asynchronous online classes. *Journal of Online Learning and Teaching*, 10(2), 240–254.
- Duncan, K., Kenworthy, A., & McNamara, R. (2012). The effect of synchronous and asynchronous participation on students' performance in online accounting courses. *Accounting Education: an international journal*, Vol. 21, No. 4, 431–449.
- EIT Digital. (2022). *THE FUTURE OF EDUCATION*. Brussels, Belgium: EIT Digital, Co-funded by the European Union.
- Elhaty, I., Elhadary, T., El Gamil, R., & Kilic, H. (2020). Teaching University Practical Courses Online during COVID-19 Crisis: A Challenge for E-Learning. *Journal of Critical Reviews*, 7(8).

- Firmin, R., Schiorring, E., Whitmer, J., Willett, T., Collins, E., & Sujitparapitaya, S. (2014). Case study: Using MOOCs for conventional college coursework. *Distance Education*, 35(2), 178–201.
- Fogarty, T. (2020). Accounting education in the post-COVID world: Looking into the Mirror of Erised. *Accounting Education*, 29(6), 563-571.
- Garrison, D., & Cleveland-Innes, M. (2005). Facilitating cognitive presence in online learning: Interaction is not enough. *American Journal of Distance Education*, 19(3), 133-148.
- Gerald, B. (2018). A brief review of independent, dependent, and one sample t-test. *International journal of applied mathematics and theoretical physics*, 4(2), 50-54.
- Grace, D., Weaven, S., Bodey, K., Ross, M., & Weaven, K. (2012). Putting student evaluations into perspective: The course experience quality and satisfaction model (CEQS). *Studies in Educational Evaluation*, 38(2), 35–43.
- Griffiths, M., & Graham, C. (2009). The potential of asynchronous video in online education. *Distance Learning*, 6(2), 13.
- Han, X., Zhou, Q., Shi, W., & Yang, S. (2020). Online Learning in Vocational Education of Chinaduring COVID-19: Achievements, Challenges, and Future Developments. *Journal of Educational Technology Development and Exchange*, 13(2), 61-82.
- Hodges, C., Moore, S., Lockee, B., Trust, T., & Bond, A. (2020). The Difference Between Emergency Remote Teaching and Online Learning. *EDUCAUSE Review*. Retrieved from <https://er.educause.edu/articles/2020/3/the-difference-between-emergency-remote-teaching-and-online-learning>
- Hussin, W., Harun, J., & Shukor, N. A. (2019). A Review on the Classification of Students' Interaction in Online Social Collaborative Problem-based Learning Environment: How Can We Enhance the Students' Online Interaction? *Universal Journal of Educational Research*, 7(9A): 125-134.
- Kaplan, A. M., & Haenlein, M. (2016). Higher education and the digital revolution: About MOOCs, SPOCs, social media, and the Cookie Monster. *Business Horizons*, 59 (4), 441-450.
- Lei, J., Luo, P. H., Wang, Q., Shen, J., Lee, S., & Chen, Y. (2016). Using Technology to Facilitate Modeling-Based Science Education: Lessons Learned from a Meta-analysis of Empirical Research. *Journal of Educational Technology Development and Exchange*, 9(2), 53-83.
- Lenert, K. A., & Janes, D. P. (2017). The incorporation of quality attributes into online course design in higher education. *International Journal of E-Learning & Distance Education*, 32(1), 1–14.
- Lloyd, S. A., & Robertson, C. L. (2012). Screencast Tutorials Enhance Student Learning of Statistics. *Teaching of Psychology*, 39(1), 67–71.
- Love, N., & Fry, N. (2006). Accounting Students' Perceptions of aVirtual Learning Environment:Springboard or Safety Net? *Accounting Education: an international journal*, 15(2), 151-166.
- Manca, S., & Ranieri, M. (2016). Is Facebook still a suitable technology-enhanced learning environment? An updated critical review of the literature from 2012 to 2015. *Journal of Computer Assisted Learning*, 32, 503–528.
- Mandernach, B. J. (2009). Effect of Instructor-Personalized Multimedia in the Online Classroom. *InternationalReview of Research in Open andDistance Learning*, 10 (3).

- Mardini, G. H., & Mah'd, O. (2022). Distance learning as emergency remote teaching vs. traditional. *The Journal of Accounting Education (JAEd)*.
- Mayer, R. E., & Moreno, R. (2003). Nine ways to reduce cognitive load in multimedia learning. *Educational psychologist*, 38(1), 43–52.
- MBO-Today. (2021). *Tweede Kamer wil rem zetten op online onderwijs*. Retrieved from MBO-today: <https://mbo-today.nl/tweede-kamer-wil-rem-zetten-op-online-onderwijs/>
- McBrien, J. L., Cheng, R., & Jones, P. (2009). Virtual spaces: Employing a synchronous online classroom to facilitate student engagement in online learning. *International Review of Research in Open and Distributed Learning*, 10(3).
- McGuigan, N. (2021). Future-proofing accounting education: Educating for complexity, ambiguity and uncertainty. *Revista Contabilidade and Finanças*, 32(87), 383–389.
- Means, B., Toyama, Y., Murphy, R., Bakia, M., & Jones, K. (2009). Evaluation of evidence-based practices in online learning: A meta-analysis and review of online learning studies. *U.S. Department of Education*.
- Mishra, P., Singh, U., Pandey, C., Mishra, P., & Pandey, G. (2019). Application of student's t-test, analysis of variance, and covariance. *Annals of cardiac anaesthesia*, 22(4), 407.
- O'Connel, B., Tharapos, M., De Lange, P., & Beatson, N. (2022). Revitalising the enterprise university post-COVID 19: A focus on business schools. *Meditari Accountancy Research*, . <https://doi.org/10.1108/MEDAR-06-2021-1332>.
- Palvia, S., Aeron, P., Gupta, P., Mahapatra, D., Parida, R., Rosner, R., & Sindhi, S. (2018). Online education: Worldwide status, challenges, trends, and implications. *Journal of Global Information Technology Management*, 21(4), 233-241.
- Perera, L., & Richardson, P. (2010). Students' Use of Online Academic Resources within a Course Web Site and Its Relationship with Their Course Performance: An Exploratory Study. *Accounting Education: an international journal*, Vol. 19, No. 6, 587–600.
- Robinson, C. C., & Hullinger, H. (Robinson, C. C., & Hullinger, H. (2008).). New benchmarks in higher education: Student engagement in online learning. *Journal of Education for Business*, 84(2), 101–109.
- Sadeghi, M. (2019). A shift from classroom to distance learning: Advantages and limitations. *International Journal of Research in English Education*, 4(1), 80-88.
- Sangster, A., Stoner, G., & Flood, B. (2020). Insights into accounting education in a COVID-19 world. *Accounting Education*, 29(5), 431–562.
- Sargent, C. S., Brothick, A. F., & Lederberg, A. R. (2011). Improving Retention for Principles of Accounting Students: Ultra-Short Online Tutorials for Motivating Effort and Improving Performance. *Accounting Education*, 26(4):657-679.
- Spilker, M., Rocha, A., Afonso, A., & Morgado, L. (2021). "Mission Possible": Supporting an adoption of a distance learning model for schools during the pandemic. *European Distance and E-Learning Network (EDEN)*, ISSN 2702-2819, 251-264.
- Spoel, I., Noroozi, O., Schuurink, E., & Ginkel, S. (2020). Teachers' online teaching expectations and experiences during the Covid19-pandemic in the Netherlands. *European journal of teacher education*, 43:4, 623-638.
- Suryawathy, I. A., & Putra, I. C. (2014). BRIDGING THE GAP BETWEEN ACCOUNTING EDUCATION AND ACCOUNTING IN PRACTICE: THE CASE OF UNIVERSITAS MAHASARASWATI

- DENPASAR. *Asia Pacific Journal of Accounting and Finance Special Issues*, ISSN 2087-4499, 59-72.
- Swanson, A., Davis, B., Parks, O., Atkinson, S., Forde, B., Choi, K., & Washington, V. (2015). Student engagement, e-connectivity, and creating relationships in the online classroom: Emerging themes. *Instructional Technology*, 66.
- Thango, B. A. (2022). Application of the Analysis of Variance (ANOVA) in the Interpretation of Power Transformer Faults. *Energies*, 15(19), 7224.
- Tharapos, M. (2021). Opportunity in an uncertain future: Reconceptualising accounting education for the post-COVID-19 world. *Accounting Education*, 1-12.
- UN. (2022). *Coronavirus*. Retrieved from United Nations Development Programme: <https://www.undp.org/coronavirus>
- White, A. (2021). May you live in interesting times: A reflection on academic integrity and accounting assessment during COVID-19 and online learning. *Accounting Research Journal*, 34(3), 304–312.
- WHO. (2022). *WHO Coronavirus (COVID-19) Dashboard*. Retrieved from World Health Organization: <https://covid19.who.int/>
- Yan, L., Guan, Q., Chen, G., Whitelock-Wainwright, A., & Wen, G. (2021). Students' experience of online learning during the COVID-19 pandemic: A province-wide survey study. *British Journal of Educational Technology*, 52:2038–2057.
- Zhang, D., Zhou, L., Briggs, O., & Nunamaker Jr., J. F. (2006). Instructional video in e-learning: Assessing the impact of interactive video on learning effectiveness. *Information & Management*, 43, 15-27.
- Zhu, F. X., & Fleming, R. S. (2017). Aligning Assurance of Learning Activities with the 2013 AACSB Standards. *Business Education Innovation Journal*, 9(1), 49-56.