

UNIVERSITY OF TWENTE.

From Face-to-Face to E-Learning?
Studying in the Midst of a Global Pandemic

Bachelor Thesis

S [REDACTED] Weis / [REDACTED]

Public Governance across Borders

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Reference Number Ethical Approval: [REDACTED]

Date of Submission: 30.06.2021

Date of Presentation: 01.07.2021

Word count: 10708

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Abstract

Drastic changes in higher education which are due to the outbreak of COVID-19 are a major challenge for the whole higher educational sector. Students, lecturers and everybody else involved in higher education had to adapt to the new and specific requirements. Students have lost their jobs or faced other extraordinary circumstances due to the pandemic. It is therefore not clear if the circumstances allow for, and if students are able to equally participate during the online semesters. Since this topic is currently highly relevant and will be for future research, the following research question will be addressed: *To what extent is equality ensured for the students in Germany during the by the pandemic induced online semesters at on-campus higher education institutions?*

This research question is answered using a qualitative research design and applying the triangulation approach by conducting a literature review, document analysis, and two expert interviews. The results indicate that equality is only given to a limited extent, as some groups of students could not participate equally, because of unequal conditions and opportunities. This research is especially relevant for higher education institutions as it will give implications on how to provide equality for students during these challenging times.

Keywords: equality, higher education, students, Germany

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List of Abbreviations

BAföG	Bundesausbildungsförderungsgesetz
DZHW	Deutsches Zentrum für Hochschul- und Wissenschaftsforschung GmbH
E-learning	Online learning
FIDL	Forschungs und Innovationslabor Digitale Lehre

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Figure 1: Activity Theory

1. Introduction

From Face-to-Face to e-Learning? The on-going Corona pandemic shows that sustainable strategies for digitalisation are essential in the higher education sector (Goertz, 2021). Due to the indispensable transition to online education in 2020, the on-campus higher education institutions in Germany were faced with a major challenge (Federal Ministry of Health, 2021; Goertz, 2021). Therefore, this introduction will give an overview on the context of online learning at on-campus higher education institutions as well as the social and scientific relevance of this topic and will provide the research question addressed.

1.1 Context of Research

Researchers showed that the strategic and organisational concepts for digitalisation in higher education in Germany varied drastically between federal states in 2019 (Gilch, 2019). Also, in 2019, federal states such as Baden-Württemberg or Bavaria rated the importance of digitalisation highly, while eastern German states only rated it as moderately important (Gilch, 2019). Moreover, the majority of higher education institutions were experiencing high to very high IT personnel shortages (Gilch, 2019). As digitalisation could be an important indicator for how successful the online semesters are executed and considering the rapid change the higher education institutions had to go through, it is questionable whether those institutions could ensure equality for students in learning opportunities and if the students are able to meet the requirements and have the necessary conditions and infrastructure for online education.

In the previous year, researchers from different nations conducted studies on the pandemic's impact on higher education. According to Farrah et al. (2020), online learning measurements taken at Palestinian higher education institutions during the pandemic made students more confident, improved their technological abilities, and made them more self-reliant. On the contrary, it also exposed them to unreliable evaluation procedures and inadequate technological infrastructure (Farrah et al., 2020). Since some of the obstacles seem to reduce the success of online learning, it was found that educational institutions should provide training programs for lecturers, including students who lack the requisite technological abilities (Farrah et al., 2020). Therefore, they came to the conclusion that institutions should expand technological

support for both students and lecturers as well as provide hardware for students, since some are not able to afford reliable tools like laptops or tablets (Farrah et al., 2020). Similarly, during the pandemic in Pakistan, Adnan et al. (2020) conducted a study on students' perceptions on online learning and discovered that online learning is not as successful as traditional learning. This is due to unequal internet access, with only 71.4 percent of students considering that they are qualified to use technological devices for online learning (Adnan et al., 2020). The researchers came to the conclusion that a lack of interaction with the lecturers, the delayed response time and a lack of traditional socialisation made studying substantially more difficult for students (Adnan et al., 2020).

As Germany is one of the most developed countries world-wide (Statistisches Bundesamt, 2021), one could argue that great conditions for equality in higher education are ensured. Therefore, it is especially interesting to find out how the online semesters were perceived by the students and if students have equal opportunity and conditions to participate during the online semesters. However, students could have varying levels of technological proficiency and capability to use online learning practices and techniques, an inadequate living environment or unequal access (e.g., to technological hardware). Thus, it is expected that equality could only be ensured to a limited extent.

1.2 Scientific Relevance

Since the outburst of the COVID-19 virus drastically changed learning in higher education in the previous year, students' perceptions and experiences of reality have also changed (Adnan et al., 2020; Farrah et al., 2020). We are currently still facing the pandemic with unknown consequences not only for the economic sector but also, a fact that is often seemingly overlooked in society, especially the educational sector (Vogel, 2021). In order to contain the rapid spread of the Corona virus by limiting contacts, learning in higher education took place online. There are numerous challenges associated with this rapid change from face-to-face to online education, ranging from institutional technological infrastructure to lecturers' capacity to design successful online courses and students' ability to use it and engage. Due to the pandemic, some students may have lost their jobs or found themselves facing other extraordinary circumstances (Grahm, 2020). According to research from other nations, students may not always be able to participate equally in higher education (Adnan et

al., 2020; Farrah et al., 2020). As a result, it is possible that for also for German students' equality could not be ensured. Hence, providing an answer to the question to what extent equality is ensured for students in Germany at on-campus higher education institutions will be highly relevant. It will be of highest interest to find out what consequences this rapid change from face-to-face learning at on-campus higher education institutions to complete online learning has on students in higher education. Since the topic is not yet well researched in Germany, this Bachelor Thesis could give further implications in the form of recommendations for higher educational institutions and is thereby of high social as well as scientific relevance.

1.3 Research Question

Therefore, the following research question will be addressed:

To what extent is equality ensured for the students in Germany during the by the pandemic induced online semesters at on-campus higher education institutions?

1.4 Structure of the Thesis

To begin with, the theoretical foundations in relation to equality are presented and put into context with higher education (2.1.). Thereafter, all research methods employed will be explained (chapter 3). Following, the analysis of all documents and interviews provides important implications for answering the research question (chapter 4). Subsequently, the conclusion will give an answer to the research question, followed by practical recommendations and implications to ensure equal online education in higher education during the Corona pandemic (chapters 5 and 6).

2. Theoretical Framework

The theoretical framework builds on various findings and important implications on equality in higher education. In the following sections, the term equality will be put into the context of higher education as described by Helmut Heid (1988). Subsequently, the Activity Theory as applied by Issroff and Scanlon (2002; 2005) will be explained as it will be used in the analysis section.

2.1 Equality in the Context of Online Education

First of all, the concept of equality in education must be separated from the concept of inequality. Helmut Heid divides equality in education into three dimensions: the first being **learning requirements**, the second **learning opportunities** and the third **learning outcomes** (1988). He came to the conclusion that equal learning conditions and opportunities lead to the same learning result and learning success (Heid, 1988). At the same time, the equal learning conditions but unequal learning opportunities lead to unequal learning results and learning success (Heid, 1988). Moreover, unequal learning conditions and equal opportunities lead to increased unequal learning opportunities. Further, unequal learning conditions and opportunities result in the most unequal learning results and learning success (Heid, 1988). Leading to the finding, that it is crucial for higher education to provide equal opportunities and equal condition in order to ensure equality.

One could argue that the desire and demand for equality in higher education does only make sense if there is inequality present and if equality is desirable (Heid, 1988). Equality is desirable as “Bildung ist Bürgerrecht” (Heid, 1988, p.5), meaning that education is a citizen’s right, as stated in the German constitution, which is one of the strong arguments that makes the demand for equality valid. Moreover, the principle includes the demand to open competition to all, that is also to those who have hitherto been disadvantaged and could potentially raise the educational level of society (Heid, 1988). In addition, educational equality could also lead to the expansion and support of social equality and the free development of the personality (Heid, 1988). As it becomes increasingly important for individuals to understand interrelationships in an ever more complex world and to be able to compete with the ever-increasing level of education, this seems an appropriate demand (Statistisches Bundesamt, 2020a).

Nevertheless, some argue that promotion and success in the German, hierarchically structured, education system can only exist where not everyone can rise up (Heid, 1988). Because if every individual can rise up, everyone would be at the same level and no one could develop further (Heid, 1988). As a consequence, the successes of individuals are and remain linked to the failure of many others (Heid, 1988).

One could argue that this incidence is highly unlikely, and the German higher education system does still not promote fully equal learning conditions and opportunities. Therefore, this assumption will not be pursued further here. Besides, it could additionally be argued that not every individual aspires to complete higher education which is why it is still important to create equal opportunity and equal conditions in higher education.

2.2 The Activity Theory

In order to be able to analyse if equality could be ensured during the rapid change to online education in higher education institutions, the Activity Theory will be applied. The researchers Issroff and Scanlon (2002; 2005) employed the Activity Theory in order to be able to consider the enhancement of learning through the use of technology in higher education.

Figure 1.

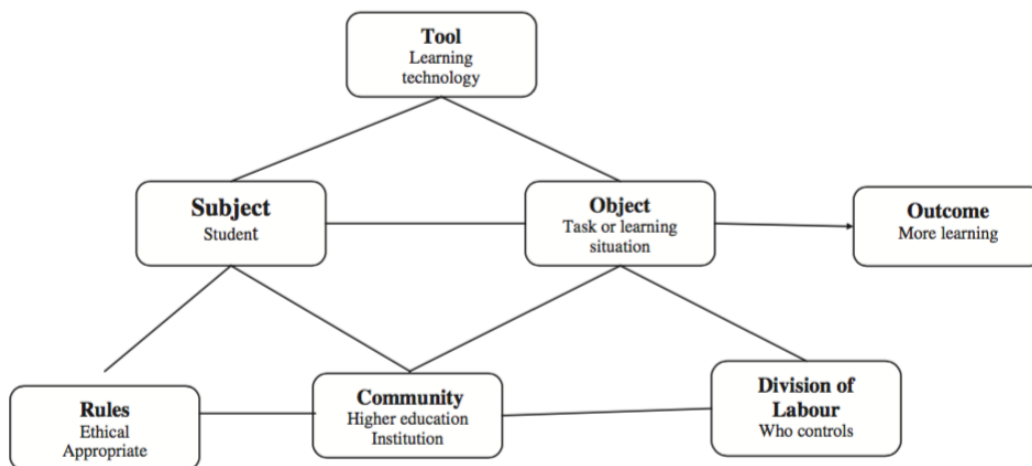


Fig. 1 An activity system for settings involving the use of technology in higher education.

Note. Activity Theory as derived from Issroff, K., Scanlon, E. (2005). *Activity theory and Higher Education: evaluating learning technologies*. *Journal of Computer Assisted Learning*, 21, 430–439.

As depicted in Figure 1., it is assumed “that the **tool** is [a] learning technology in the community of a higher education institution, the **subject** is the student, and the **object** is the purpose of the task, while the desired **outcome** is more learning for the student” (Issroff et al., 2005, p.432). The changes, hereafter referred to as activities, in tool, object, within the community and the rules might have an impact on the subject, which are the students in higher education (Issroff et al., 2005). This model will be applied to students at higher education institutions within a German federal state, analysing the larger context and not the individual level, thereby the community in this thesis is defined to include stakeholders at higher education institutions in Bavaria.

There are three mutual relationships between the subject, the object and the community (Issroff et al., 2002). Tools mediate the subject-object relationship, whereas rules mediate the subject-community relationship (Issroff et al., 2002). The relationship between object and community is mediated by the division of labour (Issroff et al., 2002). The tool is anything that is used in the transformation process, while the rules are community norms and social relations that are both explicit and implicit (Issroff et al., 2002). The division of labour refers to the explicit and implicit community organisation in relation to the object-to-outcome transformation process (Issroff et al., 2002). Activities are nodes in cross-hierarchies and networks that are influenced by other activities, rather than isolated units (Issroff et al., 2002).

External influences, such as the rapid change from face-to-face to online education change elements of activities. This causes imbalances between the elements and result in contradictions, which are central to the theory (Issroff et al., 2002). Further, a contradiction could arise, for example, when a new tool is introduced into a community that lacks any rules of practice for making effective use of that tool (Issroff et al., 2002). Contradictions are both a source of development and a source of challenges. Activity Systems are almost always in constant change because they are attempting to resolve inconsistencies (Issroff et al., 2002).

Issroff and Scanlon applied the Activity Theory in order to analyse two case studies which represent contrasting uses of technology to enhance learning and found that it is an effective approach for analysing and describing students' and lecturers' learning experiences when using technology (Issroff et al., 2002). Concluding, that the Activity Theory contributes to the understanding that incorporating learning technology into a learning situation affects the practice within that discipline (Issroff et al., 2002).

2.3 Conceptualisation

The concept of equality for students in higher education during the pandemic induced online semesters in this research is considerably broad. It comprises all students in one group. Therefore, those students who were found especially vulnerable will be laid a special focus on and are categorized based on findings of a quantitative study. The term equality will be employed as depicted in section 2.1. and as defined by Heid.

3. Data and Documents

This chapter provides a comprehensive insight on the methods employed conducting and analysing data in this study, including the research design, the data collection method as well as data analysis and validity which will be elaborated in the following.

3.1 Research Design

The research design is an exploratory case study design, as the observations of the extent of ensured equality for students is constructed mainly from one single case, the German federal state Bavaria. By using more than one data collection method, a phenomenon is investigated in its context, thereby providing a detailed description of a case (Zaidah, 2007). Thus, through a detailed contextual analysis of an event and its conditions, as well as their relationships, exploring and investigating the real-life phenomenon of equality in higher education (Zaidah, 2007).

Applying this approach, the most suitable design is the qualitative design. The research question posed in this research is descriptive and aims to find out to what extent equality is ensured during the pandemic induced online semesters. Research questions in qualitative study designs tend to be "broad and flexible" (Salkind, 2010c, p.5). Moreover, qualitative research simply requires a broader and less restrictive concept of design (Maxwell, 2009).

3.2 Case Selection and Description

A case study focuses on a geographic region or a small number of people as research subjects (Zaidah, 2007). Since higher education is a state matter, different regulations apply in each state (Bundesministerium für Bildung und Forschung, n.d.). Therefore, one German federal state is chosen to be analysed in depth. For the purposes of providing a better understanding, if equality is ensured during the online semesters, the study focuses mainly on Bavarian students, as Bavaria is one of the wealthiest and the largest federal state in Germany (Statistisches Bundesamt, 2020b). Moreover, the Bavarian state introduced a Hightech Agenda before the pandemic started, which could already have a positive effect on online education and was an additional argument for choosing this state. "Germany is hesitant, Bavaria takes action." stated Markus Söder, prime minister of the Bavarian state in October 2019, delivering his government statement to the Bavarian State Parliament on the Hightech Agenda at higher education institutions in Bavaria (Söder, 2019, p.18). This includes extensive

reforms and inventions in the form of four programmes (Söder, 2019). The Artificial Intelligence and SuperTech Programme with 600 million euros, the Redevelopment and Acceleration Programme with 600 million euros, a higher education reform with 400 million euros and a sustainable mid-sized enterprise offensive for the Bavarian economy with 400 million euros (Söder, 2019). The goal was to appoint 1,000 new professors and create 10,000 additional new study places (Söder, 2019). Together with the 18,000 study places already agreed upon in the coalition agreement, this amounts to almost 30,000, especially for technology and computer science (Söder, 2019).

It becomes clear that the Bavarian state already put a greater emphasis on digitalisation before the pandemic started. It could be expected that therefore, enough technological and financial infrastructure and resources are available in Bavaria in order to be able to react to the resulting changes of the pandemic; if this is the case will be investigated in the further course of the study.

Beyond that, the “Forschungs- und Innovationslabor Digitale Lehre” (hereafter only referred to as FIDL) conducted a quantitative study on students and lecturers’ perceptions on the online semesters across Bavaria from the end of May 2020 to July 15th, 2020 (Kreulich et al., 2020). The survey was conducted using standardised questions throughout Bavaria and the respondents had the opportunity to additionally add their own questions and answers (Kreulich et al., 2020). This document provides important implication for further research for the Bavarian case. Moreover, the interviews conducted with two experts in Bavaria, working within the field of higher education, will give further significant implications for this case.

3.3 Data Collection

In this study, a document study, semi-structured expert interviews and literature findings are combined, applying the triangulation approach as proposed by Van Thiel (2014). According to Van Thiel, this mixed method design combines methodologies such as observation, content analysis, and interviews (Van Thiel, 2014). The expert interviews’ data is combined with the findings of the “Deutsches Zentrum für Hochschul- und Wissenschaftsforschung GmbH” (hereafter only referred to as DZHW) and the FIDL paper publications, as well as theories on equality in higher education. Both documents will be consulted in order to check for equality in German and furthermore specifically Bavarian higher education institutions. A literature review is conducted to gain an understanding of the topic, define all terms and concepts and

clarify the research question. As a result, it can be built on significant implications for fundamental concepts of equality in online education. The data was collected mainly via online desk research using platforms like FINDUT, disco, google scholar and others, using primarily peer reviewed articles and quantitative studies from established institutes conducted recently. Therefore, mainly internet-based research is employed as a method to collect data (Salkind, 2010a). The quantitative studies used in this study will be depicted in the following.

The first study that is used in this research is the recently conducted large-scale study focusing on "Studying in times of the Corona pandemic" from the DZHW, providing insights into the living and studying situation as well as the state of mind on online education of students in Germany (Zimmer et al., 2021). The data is quantitative, and the survey design is cross-sectional. The project started on 05th of January 2020 and ended on 30th of April 2021 (Zimmer et al., 2021). Approximately 200,000 students from 24 state universities of different sizes, subject structures and regional locations selected nationwide were invited to participate (Zimmer et al., 2021). Almost 28,600 students took part in the nationwide Corona survey conducted by the DZHW and the AG Hochschulforschung in the summer semester of 2020 (Zimmer et al., 2021). The results of the study were published in multiple steps in several publications (Zimmer et al., 2021). Of particular interest for this study is the publication on the stress perception of vulnerable student groups from February 2021 (Zimmer et al., 2021).

The second study used in this research is by the FIDL, which conducted the quantitative study in close coordination with the existing Application Centres for Digital Teaching (ADL), the contact points for digital teaching in the Bavarian universities of applied sciences and in dialogue with all vice-presidents for higher education in Bavaria (Kreulich et al., 2020).

During the 2020 summer semester, an alternative digital teaching programme was developed and implemented throughout Bavaria for the more than 100,000 students in the Bavarian higher education (Kreulich et al., 2020). The aim of the study was to address the topics of advantages and disadvantages of digital teaching at Bavarian higher education institutions as well as the motivation of lecturers and students to use digital teaching on a 3-point, 5-point or 6-point scale using questionnaires (one for lecturers, one for students) (Kreulich et al., 2020). The survey period ran from the end of May 2020 to 15th of July 2020 (Kreulich et al., 2020). The total number of

participating students is 18,496 and among the lecturers it amounts to 2,848 (Kreulich et al., 2020). The surveys were conducted among lecturers and students and separately by each higher education institution and the questions were formulated uniformly throughout Bavaria (Kreulich et al., 2020). In addition, each higher education institution was able to supplement the questionnaires with its own questions (Kreulich et al., 2020). However, the data analyses and evaluations of this study will only refer to questions which were posed at all higher education institutions. Additionally, an expert discussion was held by the Vice-Presidents for Studies and Teaching (Kreulich et al., 2020). On the 3rd of July 2020, this expert discussion took place with 14 experts from 14 higher education institutions via the online platform Zoom (Kreulich et al., 2020).

In addition to these documents, two semi-structured expert interviews were conducted. Few people are eligible for an interview because the research question is very specific and only focuses on equality in higher education in Bavaria. Both experts were found doing desk-research on suitable institutions. The first interviewee is employed as an Executive in a Bavarian state student union (Studentenwerk) and the second interviewee is the spokesperson and member of management at the Bavarian State Student Council. Given that both experts work in the field of higher education in Bavaria, it was expected that they would have a wide knowledge of the higher education sector in Bavaria as well as deep knowledge of current changes and challenges in higher education institutions during the pandemic. This is why they were chosen and contacted via telephone (phone numbers retrieved from the respective institutions).

Normally, interviews can be conducted face-to-face in the respondents' home or other venue which allows for a private atmosphere (Salkind, 2010b). Since the outbreak of the Corona virus has made face-to-face interviews inadmissible, the interview was held by telephone. Generally, interviews should be held in a friendly manner and permission must be requested (Salkind, 2010b), which has been obtained for both interview partners for the recording of the audio of the interview. Furthermore, anonymity and confidentiality were declared and the estimated time for the interview given (Salkind, 2010b), which were 30 minutes. Errors and biases are prevented by applying interview-respondent matching and prompt and ongoing feedback for the respondent (Salkind, 2010b).

Moreover, a semi-structured interview style is employed, asking open-ended questions (Salkind, 2010b). The questions are drawn from the theoretical framework as well as the quantitative studies and are tailored to the interview partners. The conversation with the interviewees focused on advantages and disadvantages of the online semesters and counter-checking the categorisation of vulnerable student groups. Following the transcription of the interviews, the next stage was to reduce and decide which material to utilize while retaining the meanings of the participants.

3.4 Data Analysis

The analysis of both documents described above will provide essential insights. The unit of analysis of this research is the German state Bavaria. As the regulations for higher education institutions differ between federal states, it makes sense to exclusively observe one single case after considering first implications from the DZHW study. The units of observation in this research are the students from higher education institutions in Bavaria.

The data will be analysed by studying to what extent equality is ensured, focusing on the advantages and disadvantages of the online semester for the students. The analysis starts by giving an overview on the online semesters in Germany, followed by categorizing especially vulnerable student groups. These vulnerable groups will be further elaborated in section 4.1.1. Thereafter, the situation of the Bavarian students is analysed and the most important implications from the interviews are included. By applying the Activity Theory, a more in-depth analysis is made of the extent to which equality is ensured for the students of the vulnerable groups in Bavaria.

3.5 Validity

In the following section the criteria employed to assure validity are depicted. Maxwell indicated, that: "Bias refers to ways in which data collection or analysis are distorted by the researcher's theory, values, or preconceptions" (2009, p.243). The choice of data, specifically potential bias in the documents, is one general concern for the method of qualitative document analysis chosen (Maxwell, 2009). In order to minimize errors, only publicly available studies from established institutions were used.

De Vaus argued that research ideally is internally and externally valid (2001). The term "internal validity" refers to the confidence and trustworthiness of the causal conclusions (De Vaus, 2001, p.28). Internal validity can be improved by structuring the study and,

for example, drawing comparisons between comparable groups to reduce ambiguities (De Vaus, 2001). External validity relates to what extent a study's findings may be applied beyond the study (De Vaus, 2001), meaning to what extent it can be generalized.

Threats to the external validity of the research could be that the status quo of digitalisation as well as the regulations for higher education vary in the federal states in Germany (Gilch, 2019; Bundesministerium für Bildung und Forschung, n.d.). Thereby, results could only partly apply to other federal states than Bavaria. Nevertheless, since Bavaria is one of the largest federal states in Germany and is comparable to other larger and wealthy federal states, like Baden-Württemberg, it could still have a notable outcome for other than Bavarian higher education institutions (Statistisches Bundesamt, 2020b). However, it should be noted that the disadvantage of a single-case study design is that it cannot provide a generalizable conclusion (Zaidah, 2007). Triangulating the study using additional methodologies to confirm the validity of the procedure is one option to overcome this (Zaidah, 2007).

Further, the triangulation approach is applied to counteract possible biases, build a strong methodological foundation, and gain an in-depth and broad understanding of students' perceptions on online education. This entails employing multiple research methods to assess the same "object of interest" (Oppermann, 2000, p.142), using multiple data sources to increase the credibility of the research (Salkind, 2010d). By conducting a literature review, analysing documents, and conducting and analysing interviews, more than two observations from different perspectives are combined (Oppermann, 2000), leading to a comprehensive understanding of equality for students in higher education. Moreover, respondent validation is applied as the interviewees were asked if they agreed with the vulnerable groups analysed from the documents, these are confirmed by both experts (Maxwell, 2009; Interview 1, I.71-79; Interview 2, I.54-67).

Therefore, the overall validity of the data is considered sufficient to make assured assumptions about the extent of equality that is ensured for students during the online semesters at on-campus higher education institutions in Bavaria.

4. Data Analysis

The research question will be answered by first, depicting and analysing students' perceptions in Germany and in the further proceedings also specifically and in more detail those of Bavarian students on online learning at on-campus higher education institutions. Thereafter, important implications of the interviews will be depicted and analysed, followed by applying all findings from the literature, documents and the expert interviews to the Activity Theory model. Therein it will be explained, to what extent equal opportunity and conditions to participate are ensured for students at on-campus higher education institutions during the by the pandemic induced online semesters.

4.1 Students Perceptions on the Online Semesters

To begin, it is necessary to ascertain German students' perceptions on the pandemic-induced online semesters at on-campus higher education institutions, as well as all factors influencing this complex topic, in order to be able to categorize student groups and further analyse the situation for Bavarian students using the FIDL's study.

4.1.1 German Students Perception on the Online Semesters

In the study conducted by the DZHW it became clear that in general symptoms such as stress, depression and anxiety have increased among all students (Zimmer et al., 2021). Studying often includes various forms of interpersonal exchange, whether through study groups, group work or merely the simple exchange among fellow students (Zimmer et al., 2021). Suddenly, everything associated with a normal student life, like get-togethers, gaining new experience, doing a semester abroad, was not simply possible, thus drastically changing the reality of students' lives (Zimmer et al., 2021). Hence, one could argue that especially for students who already found studying difficult because they were burdened by any kind of life circumstances, it was exacerbated by the forced shutting off from all on-campus activity.

Further the DZHW found that study conditions like exam situations became increasingly difficult (agreed by 58 percent of all students), especially for students with health impairments, coping with the examination requirements has become significantly difficult (agreed by 67 percent - compared to 56 percent of students without impairments; Zimmer et al., 2021). The successful implementation of digital study also depends to a large extent on students' conditions at home (Zimmer et al., 2021). If the

general conditions are inadequate for studying, for example there are insufficient opportunities for students to have privacy for lectures or learning, or a computer is not available or does not meet the necessary requirements, this has a direct influence on the feeling of stress for students (Zimmer et al., 2021). Moreover, this could have an impact on the performance of the students in their studies, which is something that will be clarified in the further proceedings.

The study further showed that especially among students with children, the living situation is hardly compatible with digital learning (Zimmer et al., 2021). One reason for this is the closure of day-care facilities and schools, which causes problems for many students with children (Zimmer et al., 2021). Furthermore, the contact situation has changed for students; the exchange with other students and teachers is difficult, because communication can only take place online (Zimmer et al., 2021). Students with children are at a disadvantage here, as they are often dependent on their family context (for example grandma or grandpa looks after the child in between) of which half of the students with children report that this is no longer possible (Zimmer et al., 2021). Therefore, German students with children seem to have a disadvantage and fewer chances for equal conditions and opportunity to participate during the online semesters.

All in all, the results show that students from vulnerable groups, meaning international students, financially unstable students (often from non-academic families), students with children, students with health impairments or students in the COVID-19 risk group perceive the study situation during corona as particularly stressful (Zimmer et al., 2021). The increased stress perception of those vulnerable groups has potential consequences (Zimmer et al., 2021). Compared to other students, the vulnerable groups with health impairments, students in the COVID-19 risk group and students with children have a particularly high perception of stress. Especially among those with health impairments, the perception of stress is extremely high at 80 percent (non-impaired only 66 percent) (Zimmer et al., 2021). Among students in the COVID-19 risk group, the statistically relevant figure is higher at 75 percent compared to 68 percent in the non-risk group (Zimmer et al., 2021). The higher perception of stress is caused by the varying general conditions for students (Zimmer et al., 2021). The fear of infection has also increased, particularly among vulnerable groups (Zimmer et al., 2021). However, the study could only confirm significant agreement for Corona risk

students and the health impaired students to be the case (Zimmer et al., 2021). Hence, higher education institutions would have to build on these findings and take further steps to address these issues (Zimmer et al., 2021).

Following these results, it is necessary to categorize these vulnerable students into four groups in order to be able to further analyse complex interactions. However, Heid argued that it is difficult to categorize all students, for example, from one social class or with a child into one category because the demands of studying are certainly always different in every study subject (Heid, 1988). Nevertheless, all students were in the same position as starting the online semesters and thus will be categorised in four groups in order to be able to make significant statements about equality in higher education during the online semesters. In the following sections of the analysis, it will be referred specifically to these groups, as they are likely to have the least chance of equal opportunity and participation, in contrast to the rest of the students.

These four groups will be categorized as:

1. financially unstable students,
2. those with health impairments (disabled and students of the COVID-19 risk group and psychological disorders),
3. international students,
4. students with children.

Therefore, the following sub-questions will be analysed in section 4.2.:

1. To what extent is equality ensured for financially unstable students during the online semesters?
2. To what extent is equality ensured for students with health impairments during the online semesters?
3. To what extent is equality ensured for international students during the online semesters?
4. To what extent is equality ensured for students with children during the online semesters?

First, however, the findings from the FIDL document and important implications from the expert interviews are presented and discussed.

4.1.2 Bavarian Students Perceptions on the Online Semesters

The survey questionnaires of the study conducted by the FIDL cover mainly the following topics: the advantages and disadvantages of digital learning/teaching at Bavarian universities of applied sciences and the motivation of staff and students in using digital methods of education.

The results showed that in general, students in Bavaria rate their digital competence as good, with two exceptions: STEM students rate themselves particularly well and on the contrary social science students particularly poorly (Kreulich et al., 2020). As positive aspects, the students at the Bavarian higher education institutions rated the flexibility of location, time and the opportunity to adjust their learning pace individually (Kreulich et al., 2020). Nevertheless, students see greater value in face-to-face learning, complain about increased learning material that must be mastered and require more guidance from lecturers (Kreulich et al., 2020). Moreover, the lack of contact between students was described as the greatest disadvantage, closely followed by the lack of contact with lecturers and then the need for greater self-discipline (Kreulich et al., 2020). Many students also have difficulties motivating themselves alone at home, and social science students in particular see the lack of face-to-face contact with fellow students as a disadvantage of online semesters (Kreulich et al., 2020). Students became increasingly lonely due to the necessary isolation of the pandemic (Interview 2, l.14ff.). Hence, it might be a greater challenge for students to find self-discipline.

In Bavaria, the required "technical understanding" (Kreulich et al., 2020, p.32) in the online semesters was not considered a disadvantage by the students. Anyhow, in the beginning, many lecturers had difficulties getting accustomed to online teaching (Interview 2, l.191-194). At the same time, some measures have been created in order to compensate for the difficult situation. For instance, many higher education institutions in Bavaria allowed students to participate in exams without counting it as a failed attempt if they failed (Interview 2, l.245ff.). The FIDL study further found that the quality of online teaching was criticised by some students in the optional text fields (Kreulich et al., 2020), according to one expert this is mainly due to inadequate didactics and/or insufficient use of the media through the lecturers (Interview 2, l.135f./193). Nonetheless, students are overall motivated to use digital teaching materials and would like face-to-face teaching to be complemented by digital teaching

elements after the pandemic (Kreulich et al., 2020). During the second online semester, lecturers in Bavaria started to integrate more interactive parts in lectures if possible and got more familiar with the online tools (Interview 2, l.191/203).

Moreover, the study revealed that students complain about an excessive workload in the online semesters and name technical problems as another challenge and disruptive factor (Kreulich et al., 2020). Additionally, students seem generally to be often reluctant to pose questions to other students and the lecturers in the online format (Interview 2, l.204f.).

Along with the survey, an expert panel interview with Vice-Presidents for Studies and Teaching was conducted, which yielded promising results (Kreulich et al., 2020). It was found that the existing conditions at higher education institutions are designed for face-to-face teaching and that digital education is possible but not easily compatible with the existing rules (Kreulich et al., 2020). On-campus and online, distance learning higher education institutions differ greatly in terms of their design and structure, which is why even though digital distance learning courses have been available for 15 years, the on-campus higher education institutions are still bound by the semester, matriculation, workload and examination regulations of face-to-face learning (Kreulich et al., 2020). All in all, the pandemic induced online semesters at on-campus higher education institutions have shown that the framework conditions for an all-digital teaching approach are not yet given (Kreulich et al., 2020). The Bavarian higher education institutions have managed to strengthen the technical infrastructure for the online semesters within a short period of time, but in the long term, both personnel and technical resources are lacking for successful online teaching (Kreulich et al., 2020). Lastly, it was noted that the lack of a consistent infrastructure prevents too many students from participating in digital learning formats (Kreulich et al., 2020). Showing that also particularly students in Bavarian might not have equal opportunities and conditions, which is analysed further by consulting the expert interviews. All in all, these findings indicate that Bavaria, even though being a wealthy state and having the means to support students faced and still faces challenges during the online semesters.

4.1.3 Important Implications from the Expert-Interviews

As stated above, most challenging during the online semesters is to provide sufficient conditions for higher education and being able to encounter the financial aspects (Kreulich et al., 2020). One interviewed expert confirmed the finding and elaborated

that the financial aspect has been the greatest challenge for students since the beginning of the pandemic (Interview 1, I.21). It became clear for the first time how many students really financed themselves through jobs in the online semesters (Interview 1, I.22f.). This developed to be a major problem, since these student jobs could not be replaced easily (Interview 1, I.24). For instance, many students had catering jobs, which they could not continue due to the pandemic and which before normally took place in the evenings and at weekends (Interview 1, I.24ff.). There was no adequate replacement for those primarily 'student' jobs (Interview 1, I.24). Meaning, that the new, exclusively online study situation has a great impact on all students and possibly could further impact the well-being and performance of students.

The Federal Ministry of Education and Research therefore created emergency programmes to address these financial challenges (Bundesministerium für Bildung und Forschung, 2020). These emergency package consists of BAföG changes for easier access (which is a German Federal Training Assistance Act by the Federal Ministry of Education and Research) and the bridging aid as a grant as well as KfW Student Loans for higher education students in Germany (Bundesministerium für Bildung und Forschung, 2020). In March 2020, a decree clarified that BAföG recipients should not encounter any disadvantages if, for example, courses or examinations cannot take place due to the Corona pandemic (Bundesministerium für Bildung und Forschung, 2020). The bridging aid is built up in the form of two pillars. The first pillar is the established KfW Student Loan, which is offered at interest-free rates for all students since May 2020 and will continue to be until the end of 2021 (Bundesministerium für Bildung und Forschung, 2020). Since June 2020 and until March 2021, the Student Loan has also been open to foreign students who were previously not eligible to apply (Bundesministerium für Bildung und Forschung, 2020). Many students, especially international students, immediately took advantage of this offer (Bundesministerium für Bildung und Forschung, 2020).

The second pillar of the bridging aid by the Federal Ministry of Education and Research is the non-repayable grant for evidentially particularly high-need students in acute emergencies caused by the pandemic (Bundesministerium für Bildung und Forschung, 2020). Applications can be submitted via the nationwide, established IT platform in a purely online procedure (Bundesministerium für Bildung und Forschung, 2020). Students from Germany and abroad who are enrolled at a state or state-recognised

higher education institution in Germany at the time of application, who live in Germany and are not on leave of absence are eligible to apply; there is no age limit (Bundesministerium für Bildung und Forschung, 2020). Students who are in a financial emergency due to the pandemic are those who, for example, have lost their part-time job, have not yet been able to find a (new) part-time job, have lost their jobs in the case of self-employment, or are no longer able to receive support from their parents due to the pandemic (Bundesministerium für Bildung und Forschung, 2020). In such cases, students can receive between 100 and 500 euros per month as a grant (Bundesministerium für Bildung und Forschung, 2020). For example: if the student's account balance is less than 100 euros, this amounts to 500 euros support (Bundesministerium für Bildung und Forschung, 2020). However, this is only possible with a bank account in Germany (Bundesministerium für Bildung und Forschung, 2020), which could be a problem for international students. Especially if they were forced to go back to their home countries due to the circumstances of the pandemic or because the renewal of the visa failed due to the administrative authorities (Interview 1, I. 3-7, I. 100-103).

Moreover, this programme could be a great start for students in urgent need, but the average amount of income needed by students per month in Germany is 918 euros (Middendorff et al., 2017). However, the average monthly amount of income largely depends on where the student lives, studies and other various factors. For example: in 2016 it was shown that students in eastern German states in comparison to western German states only have an average income of 839 euros (Middendorff et al., 2017). Therefore, also receiving 500 euros per month does not mean that these precarious situations are prevented. In addition to this financial aid provided nation-wide, which could not be sufficient enough as described above, some higher education institutions in Bavaria have initiated their own emergency funding programmes (Interview 1, I.44-47). The bridging aid is actually rather a countermeasure to the emergency funds at Bavarian higher education institutions, dedicated to for example rent or health insurance (Interview 1, I.61).

In general, requests from students in financially precarious situations at Bavarian higher education institutions can be divided into two groups; those who were already in a very precarious financial situation before the Corona crisis and those who had financial reserves but have now, after one and a half years of the pandemic, exhausted

them due to the circumstances (Interview 1, l. 54ff.). Previously, many students were able to rely on family or friends, but for many families, the source of income also fell away due to the pandemic (Interview 1, l.54). Students who would finance themselves entirely through a job often lost it, as described above (Interview 1, l.23). The Studierendenswerk (student administration, providing social, financial and support services for students) in Munich for example issued a total of 67 emergency funds in 2020 and, in comparison, only three in 2019 (Interview 1, l.40). 25 of these special emergency funds were issued in order to enable participation during the online semesters (Interview 1, l.44f.). The remaining 42 emergency funds were for standard cases, for example to pay the students rent for a month (Interview 1, l.46). Due to the ongoing pandemic in 2021, many emergency funds are already distributed because of various emergencies (Interview 1, l.49f.). Therefore, in May 2021, the budget for this year is almost spent (Interview 1, l.48ff.).

Participation in the online semester, and thus the necessary purchase of equipment (mostly technological) for some students, is another special expense that many students do not plan for, as it is more important for many to first secure their living standards (Interview 1, l.58f.). Most people believe that every student owns a laptop, but some of them are unsuitable for online education (Interview 1, ll., 28ff.). Many laptops are already past their prime and would fail during the online semester (Interview 1, l.31). Some students are thereby excluded due to a lack of technical infrastructure or have to make a significant effort to obtain a laptop and this situation, combined with the financial issue, is certainly difficult for those students (Interview 1, l.32f.). Some students take part via their smartphone, which nearly everyone seems to possess (Interview 1, l.65). That usually works, but of course there are also online learning formats where taking part via a smartphone is not suitable (Interview 1, l.66). Concluding, that students with limited financial resources are in a vulnerable position, particularly after one-and-a-half years of the pandemic and may not have equal conditions and opportunities.

In the following section the changes for Bavarian students indicated through the prompt change from face-to-face to online learning will be analysed applying the Activity Theory.

4.2 Activity Theory

The researchers Issroff and Scanlon found that the Activity Theory is a suitable framework for analysing and explaining students' and educators' learning experiences when using technology by incorporating a variety of learning settings in higher education (Issroff et al., 2005). The propositions of the theory are indicated to apply in this case. As on-campus education differs greatly from the online education that students experienced during the last semesters, the object in the context of online learning for students in higher education is to be able to get the same results as before the pandemic. Therefore, it is expected that it requires sufficient online learning methods in order to provide efficient and equal learning experiences. One could argue that due to changed circumstances of education some groups of students might need additional support from their institutions in order to ensure equality.

Many Bavarian students support online education to the extent that it ensures flexibility in terms of time and space as well as the possibility to adjust learning speed individually (Kreulich et al., 2020; Interview 1, l.3f.). The greatest activity can be detected in the dimension tool, since the on-campus, mainly face-to-face lectures and seminars changed into full online learning methods and lectures due to the pandemic (Kreulich et al., 2020). As a result, the outcome (in this particular case the performance of the students) could be changed. It is questionable whether the flexibility given by the online format ensured that students could perform at the same level. In contrast, unequal opportunities and conditions, if present, could have complicated access to the tool or the ability to achieve the object.

Overall, it should be noted that one interviewed expert stated that in comparison to the examination results achieved in previous years, there is no discernible change in the performance of the students (Interview 2, l.153ff.). There are subject areas where differences are present, but this can partly be attributed to online examination design and examination modalities (Interview 2, l.156f.). However, it cannot be conclusively clarified whether the performance of the students is due to examinations, whether it is due to the learning conditions or whether it is due to the greater flexibility. This means that the outcome of the initial activity changes in tool has remained similar despite the change in tools and object. One reason for this could be the Hightech Agenda, which already initiated significant changes after 2019 (Interview 2, l.300-303).

In the form of many new jobs and temporary positions, the Hightech Agenda has brought considerable positive change to the higher education sector (Interview 2, I.300-303). The Hightech Agenda has now been linked to the reform of the Higher Education Act (Interview 2, I.302ff.). On the other hand, one might criticise that the Hightech Agenda is exclusively built around technological disciplines (Interview 2, I.307). Therefore, it has no benefit for the humanities- and social sciences, which can only attract a small amount of third-party funding and are thereby already at a disadvantage because they have fewer opportunities to advance overall (Interview 2, I.309-312).

Beyond that, it became clear that more students are thinking about dropping out of their studies (Interview 2, I.170f.). This could be due to the increased loneliness, as students cannot meet their fellow students, they have reduced contact with the lecturers and could thereby lose the connection to their subject, their subject area and also to their higher education institution (Interview 2, I.172-175). Furthermore, the study of the FIDL found that the quality of online teaching was criticised by some students in the optional text fields (Kreulich et al., 2020, 32), these results were supported by an expert, stating that it is mainly due to inadequate didactics and/or insufficient use of the media through the lecturers (Interview 2, I.135-141). Nonetheless, students are overall motivated to use digital teaching materials and would like face-to-face teaching to be complemented by digital teaching elements after the pandemic (Kreulich et al., 2020).

In addition, a more detailed examination of the changes resulting from the online semesters and the effects on the vulnerable groups is provided in the following subsections.

4.2.1 To what extent is equality ensured for financially unstable students during the online semesters?

As elaborated before, the successful implementation of digital study depends to a large extent on students' conditions at home (Zimmer et al., 2021). Drawing back to Heid, it was argued that only equal learning conditions and opportunities lead to the same learning result (Heid, 1988). Hence, if the learning conditions for Bavarian students would vary drastically, there would be a lack of equality. The results show that financially unstable students are likelier to have insufficient opportunities for privacy for lectures or learning (e.g., due to a lack of space, a tiny room etc.) as well as insufficient technological infrastructure and are therefore likely not to have the opportunity to use

the learning methods sufficiently, even if they are provided via the educational institutions (Interview 1, I.30-34; I.58f.). The purchase of often necessary technological equipment is another special expense that many students do not plan for, as it is more important for many to first secure their living standards (Interview 1, I.58). Hence, financially unstable students have disadvantages from the change within tools and object. As elaborated in 4.1.3., students from the financially unstable group are at highest risk for disadvantage during the online semesters (Interview 1, I.21, I. 54ff).

The national emergency fund in combination with emergency programmes from the higher education institutions in Bavaria could be a viable option to confront this challenge, but the funds are nearly depleted for this year (Interview 1, I.48ff.). Concluding, that in order for financially vulnerable students to achieve the same result as other students with the same tools and the same objective, there must be alternative solutions.

4.2.2 To what extent is equality ensured for students with health impairments during the online semesters?

Students with health impairments, here counting all disabled students, students within the COVID-19 risk group as well as students with psychological disorders, perceived the online education in the first semester as significantly more stressful and found study conditions increasingly more difficult than other students excluded from this vulnerable group (Zimmer et al., 2021). Therefore, one could argue that since the pandemic induced online education is not limited in time and higher education still remains online, it can be expected that the situation will become more acute. For that, trustworthy hygiene concepts could enable some seminars or lectures to take place on site (Interview 2, I.346-350). Hygiene concepts of the higher education institutions are decided in Bavaria by the state-wide university and college association (Interview 2, I.363-372).

For the COVID-19 risk patients and those students who are afraid of infection, student associations demanded an online studyable semester for the summer semester 2021 and also the coming winter semester 2021 (Interview 2, I.382-385). Thereby ensuring that students who cannot take part, or do not want to take part in exercises or an excursion on site, are not disadvantaged from it (Interview 2, I.385-389).

Despite if students have equal access to infrastructure like a laptop and have a sufficient working environment, other circumstances could influence their educational success. In Bavarian higher education institutions, there are no separate programmes provided for this vulnerable student group, for example those with a very slow typing speed (Interview 2, I.100-107). This also applies to students with mental illnesses or students with physical disabilities, which face special challenges in the online semesters and are not particularly supported by the higher education institutions in Bavaria (Interview 2, I.78f.). In addition, the situation of mentally ill students could have intensified considerably in many cases, as they now have limited social interaction during the pandemic (Interview 2, I.63-67).

Concluding, that for students from this vulnerable group equality could not be ensured, because the higher education institutions do not provide adequate support for students with special needs. In order for students with health impairments to achieve the same result as other students with the same tools and the same objective, there must be alternative solutions. Innovation would be necessary in order to encounter these imbalances.

4.2.3 To what extent is equality ensured for international students during the online semesters?

Many Bavarian students support online education to the extent that it ensures flexibility in terms of time and space as well as the possibility to adjust learning speed individually (Kreulich et al., 2020; Interview 1, I.3f.). The flexibility is an advantage of the online semesters and especially important for international students because if they had to leave Germany, they would otherwise not be able to take part in higher education and complete their studies (Interview 1, I.3-7). Nevertheless, international students who wanted to come to Germany to study had problems with their visas because the embassy or consulate was understaffed due to the pandemic (Interview 1, I.100ff.). Some of those international students had to wait over a year for their visa and were therefore unable to start their studies in Germany, because many other issues, such as employment authorisation, are dependent on this residence title (Interview 1, I.100ff.). The pandemic has delayed the processes enormously and the students are not a top priority for visas, so they must wait longer (Interview 1, I.105ff.). Even if international students were already in Germany, it became problematic with regard to the extension of residence permits (Interview 1, I.110-116). The result is a domino

effect: if there are problems with the residence permits or if there are only temporary solutions because they cannot be processed completely, it is also difficult for those students to find a job (Interview 1, I.110-116).

Therefore, it can be concluded that for this vulnerable group equality could be ensured to a certain extent, because online education gave them flexibility in terms of location, and they could receive financial support if they are enrolled at a German higher education institution with a German bank account (Bundesministerium für Bildung und Forschung, 2020). If the circumstances named above are met, the international students have the same chance to meet the objective through the tools and are able to come to the same outcome as students outside the vulnerable groups.

4.2.4 To what extent is equality ensured for students with children during the online semesters?

Students with children were found to be a vulnerable group (Zimmer et al., 2021). It was shown that it is difficult for German students to combine online education with childcare, because many could no longer depend on the help of family and friends due to the pandemic or day-care facilities which had to close because of high incident numbers (Zimmer et al., 2021). In this vulnerable group highly individual conditions are present and no additional indication could be drawn from the data, no conclusion can be formed for Bavarian students with children. However, one could argue that those students had more difficult conditions as they had to simultaneously care for a child, but the flexibility given by the online education might have counteracted.

5. Conclusion

As depicted in 2.1., Heid argued that only equal learning conditions and opportunities lead to the same learning result and learning success (Heid, 1988). Therefore, it is important to ensure students in higher education equality in conditions and opportunities. The results derived in the analysis of the extent quality could be ensured for the students and also specifically for the vulnerable groups, will be summarized in the following.

5.1 Results and Limitations to the Research

It became apparent, that in general the existing conditions at higher education institutions in Bavaria are designed for face-to-face education and that online education is possible but not easily compatible with the existing rules (Kreulich et al., 2020). In a time of shorter and shorter innovation cycles and ever new information and communication technologies, the higher education sector and especially on-campus institutions have to adopt future-oriented strategies. The analysis showed that the least extent of equality could be ensured for the vulnerable group of financially unstable students, thereafter for the students with health impairments, followed by the group of international students.

Limitations to the research include, that it cannot be generalized. This is due to the case study design as well as the fact it mainly relies on secondary data. Furthermore, it must be reported that due to insufficient data, no significant conclusion could be drawn for the vulnerable group of students with children. However, this does not affect the findings for the other student groups. To sum it up, the variety of sources allowed to compensate for the lack of primary data, since in qualitative research “triangulation is a highly suitable means of countering problems that might arise with respect to reliability and validity” (Van Thiel, 2014, p.91). In addition, the respondent validation could ensure validity for the already derived findings from the documents.

Even though inequality made the situation more difficult for some students, there was no evident significant difference in student performance in the first online semesters compared to before the pandemic (Interview 2, I.154-158). Recommendations for further research therefore include the question to what extent the performance of the students will remain the same or change in the upcoming semesters. Additional research on the impact the pandemic has and will have on higher education will be

essential in the future. Moreover, as it was shown that students with health impairments perceived the online semesters as significantly more stressful (Zimmer et al., 2021), further research is necessary in order to find out whether this situation for these students aggravated or has remained the same.

5.2 Answer to the Research Question

In the following section the answer to the research question is provided. The study aimed to find an answer to the question:

To what extent is equality ensured for the students in Germany during the by the pandemic induced online semesters at on-campus higher education institutions?

It was found that in general, the lack of a consistent infrastructure in Bavaria prevents a large number of students from engaging in digital learning forms (Kreulich et al., 2020). The analysis of the vulnerable groups shows that equality could not be ensured, and that the inequality is particularly great for the group of financially unstable students. Those students received the lowest equal opportunity and conditions for studying during the by the pandemic induced online semesters. Even though higher education institutions and the Confederation provided programmes like emergency funds, the students have to overcome higher hurdles. However, only financial assistance will not suffice; even after the Corona pandemic, the situation may be difficult for students with more individual needs because it is unclear how it will develop after the pandemic, and it is possible that it will not improve immediately.

Concluding, that equality during the online semesters has only been ensured to a limited extent so far. This challenge requires innovative solutions that are also tailored to the most vulnerable groups. Since it is unknown how long the Corona virus will persist, it is important to consider long-term solutions for online learning in higher education. As a result of the challenges depicted above, practical recommendations for higher education institutions will be presented in the following.

6. Practical Recommendations

The findings indicate that it is necessary to respond even more individually to the challenges and problems of students, particularly to those in the vulnerable groups. As described above, students are overall motivated to use digital education methods and would like face-to-face teaching to be complemented by digital teaching elements after the pandemic (Kreulich, 2020, 35). As a result, the digitalisation approaches and online education concepts introduced in the near future must be designed to generate a long-term sustainable development.

In general, higher education institutions throughout Germany should instill a greater sense of security in their students. They could accomplish this by communicating earlier and more frequently. For example, it took far too long to announce that the standard period of study had been suspended, affecting financially disadvantaged students in particular (Interview 2, I.222-232). Such decisions can have a significant impact on students' lives, because students who are receiving BAföG no longer receive financial support if they study for longer than the standard period of study, which is why this uncertainty can be problematic. Therefore, transparent, prompt and reliable communication from the higher education institutions is essential.

Furthermore, a loan for technical devices such as laptops or tablets could be initiated at higher education institutions. This could ensure that more students are able to participate in online education. Another potentially beneficial intervention would be to implement surveys at the institutions at the beginning and/or end of each semester. These could include questions about students' and teachers' current situations. This would allow problems to be addressed in a more timely and flexible manner. The psychological stress could be counteracted by offering more counselling and support services in general, as well as by quickly expanding the psycho-social support services. Simultaneously, it would be possible to advertise these offers more actively (for example, by emailing directly to students) and provide additional online council hours. This would also apply for students with children, which could be supported by higher education institutions offering counselling and arranging a child-care service. Moreover, stress could be reduced by introducing a generally applicable rule for extensions of deadlines.

Hygiene concepts and online education at higher education institutions should be further maintained, adapted and be assessable so that students in the Corona risk

group feel safe as well and international students will be able to participate. Therefore, for the time being, online learning should be possible so that everyone has the opportunity to participate. As it was found that students felt like they became increasingly lonely after months of the pandemic, many students would prefer for part of their studies to take place on site again and would like to be able to meet again (Interview 2, l.14-18, l.411-419). Social exchange between students could be facilitated with the gradual opening of the refectory, study rooms and libraries, thus offering students a perspective. In addition, COVID-19-compliant sports, culture and leisure activities could be offered.

Officially, vaccination prioritisation in Germany was lifted on the 7th of June 2021 (Bundesministerium Für Gesundheit, 2021). Accordingly, many students could be vaccinated before the coming winter semester 2021. However, the problem in many parts of the country is that only a limited amount of vaccine is available (Bundesministerium Für Gesundheit, 2021). Therefore, the old vaccination prioritisation was often adhered to, meaning that people from high-risk groups were vaccinated first (Bundesministerium Für Gesundheit, 2021). Hence, most students in Germany are among the last to be vaccinated, as they are often in the lowest risk group (Bundesministerium Für Gesundheit, 2021). Thus, it would be a great step forward if higher education institutions could organize a vaccination programme starting with the beginning of the semester in October 2021.

Considering the students in Bavaria, it is important to remember that a change is currently taking place due to the fact that the higher education law is set to be reformed in the near future and will be fused with the Hightech Agenda (Interview 2, l.308ff.). Moreover, the Hightech Agenda includes some investments which may be noticeable in the coming months and years (Söder, 2019). Consequently, the same recommendations as described above apply here, but it would be interesting to learn more about how higher education in Bavaria will develop in the future through additional research. However, it became clear that further effort is needed to include vulnerable groups, as well as students in humanities and social science programs, who describe themselves as not very tech-savvy and are not specifically considered by the Hightech Agenda.

Lastly, in a highly digitalised world, digital literacy should ideally be considered part of the teaching qualification. This would enable institutions to react faster and more

confident in similar situations in the future, and to provide excellent education from the start. All of these proposed steps could help to ensure equality for students in higher education.

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