Bachelor's Thesis

Students` technology acceptance and their perception of learning management systems

A case study in Germany and The Netherlands

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Public Governance across Borders

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27.06.2023

Word count: 10.553

Ethical Approval number: 230433

Abstract

This case study offers a cross-country analysis of students' technology acceptance in Germany and the Netherlands. It applies the General Extended Technology Acceptance Model for E-Learning (GETAMEL). Data from three cohorts of the binational joint degree "Public Governance Across Borders" (PGaB) was collected via an online survey. Hypothesis testing was conducted using bivariate, multiple regression and moderation analysis followed by textual analysis. The findings indicate that within the PGaB students *Experience, Self-Efficacy* and *Perceived Usefulness* significantly influence the *Behavioural Intention* to use Learning Management Systems (LMS). From the textual analysis, it can be derived that *Design, Usability, Technical Features* and *Study Organisation* are the most crucial categories students use to evaluate LMS. In this specific case, they ranked Canvas higher than Learnweb.

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List of abbreviations

LMS = Learning Management Systems

GETAMEL = General Extended Technology Acceptance Model for E-Learning

PGaB = Public Governance Across Borders

VLE = Virtual Learning Environments

TAM = Technology Acceptance Model

SN = Subjective norm

EXP = Experience

ENJOY = Perceived Enjoyment

CA = Computer Anxiety

SE = Self-Efficacy

PU = Perceived Usefulness

PEOU = Perceived Ease of Use

TI = Technology Innovativeness

MSnT = Management, Society and Technology

SEM = Structural Equation Modelling

1.Introduction

Higher education can be characterised as a public service. It delivers a public good to society in the form of educated citizens and public knowledge and thereby promotes welfare within society (Ewing, 2021; Lee, 2017; Spicker, 2009; Shapiro, 2009; Bloom et al. 2007 in Lee, 2017). States consider education as their task. This is visible in the fact that many states have a dedicated ministry for it or at least include it in the portfolio of one, too. In Germany for example it is part of the Basic Law, which has the rank of a constitution (Art. 72 subsection 3 point 6 & Art. 74 subsection 1 point 33). Higher education is institutionalised in and delivered by Universities. Those should therefore have the capacity to deliver this service.

The digitalisation of this institution is a key policy on the European and national level. Not only the European Union has a strategy paper to better the quality of digital education by universities and thereby enhancing the digital skills of the students (European Union & European Commission; 2020). Its member states like Germany and the Netherlands have similar strategies in place (Bundesministerium für Bildung und Forschung, 2019; Ministry of Economic Affairs and Climate Policy, 20 19). Despite being above average of public service digitalisation ranking within the EU in 2022 bot countries differ in their level of digitalisation. The Netherlands rank third overall, while Germany only eleventh. This ranking was derived from five indicators: e-Government users, pre-filled forms, digital public services for citizens and businesses and open data. The Dutch public administration is constantly under the top ten of these indicators whereas the German only in two over the EU average (European Commission, 2022). Generally, there is a difference in digitalisation level between these two countries. This digitalisation process was forcefully accelerated by the Covid-19 pandemic (Kang, 2021). The traditional on-campus face-to-face teaching was replaced by online teaching to ensure social distancing (Tarkar, 2020). Dependent on the universities` capacity to make this quick change this could feel like forced digitalisation from a student's perspective (Pohlenz et al., 2023). One digital service became the centre of online education during the pandemic. The Learning Management Systems (LMS) were used as platforms to communicate, share documents, grading and even for online lectures. Even before the pandemic, these systems were part of the university experience by students had (Hawkings & Rudy, 2009 in Naveh et al., 2010). In 2019 85% of German higher education institutions implemented those systems (Gilch et al., 2019). The acceptance of those LMS by the students is one way to evaluate the digital service delivery by universities since they are the main users of those systems and the receiver of the public service education.

The most up-to-date model of technology acceptance is the GETAMEL (General Extended Technology Acceptance Model for E-Learning) by Abdullah & Ward (2016). They argue that the acceptance of technology can be derived from the user's intention to use it. This intention is conceptualised as a combination of external fa tors and perception of usefulness and ease of the technology in question. Studies applying this model have validated it in the context of university students in Azerbaijan, Tanzania and China (Jiang et al., 2021; Chang, Hajiyev & Su, 2017; Kimathi & Zhang, 2019).

The "Public Governance Across Borders" (PGaB) program offered by the cooperating universities of Münster, Germany, and Enschede, the Netherlands is a unique case for public administration research. This Joint Dual degree (Michael & Balraj, 2003) is an interdisciplinary and bi-national political and public administration science program with a European perspective (Institut für Politikwissenschaften, 2022; University of Twente, 2022b). It offers the rare opportunity of using the perspective of students who have first-hand experience of functioning in two different educational systems and comparing the service delivery of those. Moreover, within the framework of administering a joint degree, the universities face the task of combining and coordinating two curricula, two teaching methods and two grading systems.

This study is therefore aiming to fill the research gap of E-Learning acceptance by students in the context of Covid-19 and the context of a bi-national joint degree in Germany and the Netherlands. To do so the GETAMEL can be applied. In addition, it is possible to extrapolate the capacity of the universities to deliver digital education by using the students` perspective. Results possibly could create insight into the student's preference and usage of the two LMS platforms Canvas and Learnweb. This could be used to improve the service delivery of digital learning in the context of digital transformation at universities. This is important to prepare students for a digitalised working life because the use of E-Learning impacts on the digital literacy of students (Yustika & Iswati, 2021).

The research question this paper aims to answer is:

How do students affected by Covid-19 related off-campus teaching rate the Learning Management Systems of their universities based on their technology acceptance?

This question has descriptive and explanatory elements which can be formulated into three sub-questions:

1.How do students rate the platforms in comparison to each other?

This sub-question is descriptive and relates to the pure rating the students can give each platform based on their own comparative experience.

2. What are the factors that determine students' intention to use the respective platforms?

By using the GETAMEL model the strength of the influence of several external factors on the behaviour can be measured. Therefore, this question is explanatory.

3. What are the reasons for the rating of the platforms?

As well as the sub-question above can be defined as an explanatory question, which aims at the individual reasons of the students` rating in terms of features or functionalities they like or dislike about the respective platform.

This thesis paper is structured in the following manner. In the first part, the theoretical background of capacity and digital transformation in the form of LMS will be elaborated on, followed by a detailed description of the GETAMEL. In the third part, the data collection and the study design will be presented. The collected data will be analysed in the fourth part using regression and textual analysis. The subsequent part discusses the results of the study and answers the research questions. Finally, a link to prior studies will be made and a conclusion on the technology acceptance and the students` rating of the LMS will be drawn.

2.Theory

In this section, the theoretical framework of this paper will be developed. Therefore, academic literature regarding publicness, digital transformation, capacity, technology acceptance and Learning Management Systems will be discussed. Especially the theories of technology acceptance will be introduced extensively.

2.1 Publicness

A key question of public administration research and organisational theory is whether an organisation is public or private. This question is answered differently depending on the perspective and definition of the concept of publicness. The most basic and simple distinction is made based on the legal ownership of the organisation. State-owned organisations can be considered public, while privately owned as private.(Bozemann & Bretschneider, 1994; Boyne, 2002; Lee, 2017). A second approach is the degree of exclusivity and rivalry between the consumer of a product. If a product is non-excludable and non-depletable it is a public good and the organisation that produces it can be characterised as public (Bozemann, 1987 in Lee, 2017; Ingham, 2015). A third approach emphasises whether an organisation serves a public

interest and/ or adheres to public values such as due process or welfare provision (Goodsell, 1983; Gusfield, 1984 in Lee, 2017; Antonsen & Jörgensen, 1997). In their 1994 article, Bozeman and Breitschneider realised that all the approaches mentioned above have their shortcomings and developed the dimensional approach of publicness. It combines the elements of ownership, funding and control. The latter is the essence of the publicness of an organisation. The stronger the political authority over an organisation the more public it is, and the more private or economic authority influences the organisation the more private it is. The question is therefore whether the organisation is controlled by market or political forces (Bozemam & Bretschneider, 1994; Lee, 2017). As a fourth alternative Antonsen & Jörgensen (1997) accredit publicness as a continuum between low and high.

Following the dimensional approach, universities can be defined as public organisations and thereby a subject of public administration research. They are for the most part publicly owned, funded and controlled. In addition, they do serve the public interest by contributing to economic development through the enhancement of human capital, engagement with the community (Lee, 2017) and the production of public knowledge (Jongbloed et el., 2008 in Lee, 2017). In Germany and the Netherlands, universities are under political authority. They must follow certain obligations to be recognised as universities and are controlled by and funded through the ministries of education (Bundesministerium für Bildung und Forschung, 2022; Ministerie van Onderwijs, Cultuur en Wetenschap, 2022). The Netherlands spent 4.3 Million Euros and Germany 31,8 Million Euros on tertial education in 2019 (European University Association, 2018).

2.2 Digital transformation

Universities, as many other organisations public and private, are affected by the digital transformation. Digital transformation can be defined through varying approaches. Mergel, Edelmann and Haug (2019) aimed to develop a definition from the administrator's point of view. They define digitalisation in public administration as a continuous, organisational process, which is influenced by external factors and could improve the relationship with citizens, increase their satisfaction and change the culture of the organisation (Mergel et al., 2019). Gong and Ribier (2021) used a literature review of academic publications to develop a unified definition of digital transformation from an academic point of view. They too, define digital transformation as a process. It is fuelled using digital technology and the allocation of resources to this process to improve the entities and redefine their stakeholder relationship (Gong & Ribier, 2021). The latter definition is much more extensive and contains the important

aspect of digital technology while the former includes external factors. Both entail the change of relationship with the stakeholder/customer and define it as a process. For this study, a combination of both is appropriate to account for the focus on digital technology in combination with the complex stakeholder context of the organisation university. Therefore, digital transformation will be defined as a process within an organisation which makes use of digital technology, is influenced by external factors and changes the relationship with its stakeholders and the intra-organisational culture.

2.3 Capacity

The transformation process as well as the delivery of education is dependent on the capacity of the organisation. The concept of capacity has been discussed for several years and therefore has a variety of definitions. It is considered a trait of an organisation over a range of definitions (Addison, 2009). Before giving an overview it is important to mention the relevance of capacity in general. El-Taliawi and Van der Wal (2019) argue that without the capacity to implement it the policy loses its value regardless of the quality of the drafting process. In the case of the Dutch and German universities, the digitalisation policies set out by the respective ministries would lose their value if the universities were not able to implement them. Building on this argumentation Wu, Ramesh and Howlet (2015) developed a definition of policy capacity which focuses on the whole governmental body and include and can be considered the broadest and most inclusive concept. Their definition of capacity requires three types of skills on three different levels. Those are analytical, operational and political skills on the individual, organisational and systematic level (Wu et al., 2015). Junjan (2020) focuses on the meso and macro level of an organisation in her concept of administrative capacity. Administrative capacity is a combination of "[…]analytical and operational competencies at [the] individual and organizational level."(p. 2). It thereby is a part of Wu et al.`s policy capacity. To include the influence technology has on capacity Lember, Kattel and Tornuist (2018) developed the concept of technological capacity. This concept focuses on exploring, developing and /or adapting new technological solutions in the design of public service, their delivery and evaluation (Lember et al, 2018). This definition is appropriate for evaluating the service delivery of universities in the context of digital transformation.

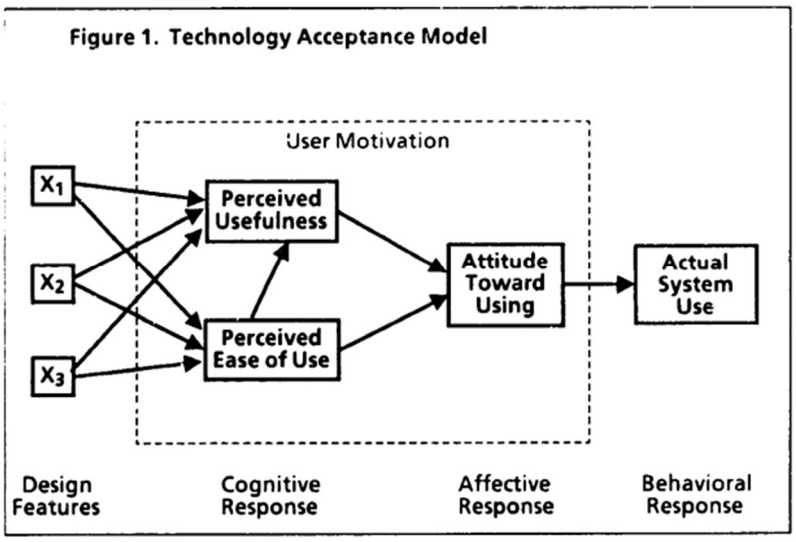
2.4 Learning Management Systems

One aspect of digital transformation and the technological capacity in and of universities is their use of digital technology in the form of e-learning. It transfers all learning activities in a network or an electronic device, regardless of the time and place of usage. It, therefore, is doable on-

and offline as well as a- or synchronously (Naidu, 2006 in Thakkar & Joshi, 2015). These networks are so-called Virtual Learning Environments (VLE) and are used for course management (Grossi et al., 2018). An alternative and more frequently used term in the context of digital transformation at universities is Learning Management System (LMS). Turnbull et al. (2019) emphasise the ability of LMS to develop, manage, and present course materials, whilst Reid (2019) adds its accessibility regardless of location (both in Kathser & Kathser, 2022). The most detailed definition is delivered by the OCED (2005). Their definition of LMS technology features personal communication (mail and chat), group communication (chat and forum), content posting (syllabus, papers and presentations), performance evaluation (tests, assignments and exams) and instruction management(grade posting and surveys) (in Naveh et al. 2010). Whether the implementation of an LMS is successful, depends on the use and the user satisfaction (Naveh et al., 2010). The University of Münster uses Learnweb (WWU Fortbildung, 2023) while the University of Twente uses Canvas (University of Twente, 2022a) as their LMS. In a comparison of Moodle and Canvas regarding usability, Grossi et al.(2018) as well as Khatser & Khatser (2022) certify the latter as more user-friendly. A Learnweb-specific study of students from the University of Münster by Thoring and colleagues (2017) discovers that a centralised platform integrating study organisation, the provision of literature as well as software is the most favourable from a student's perspective.

Figure 1

The technology acceptance model



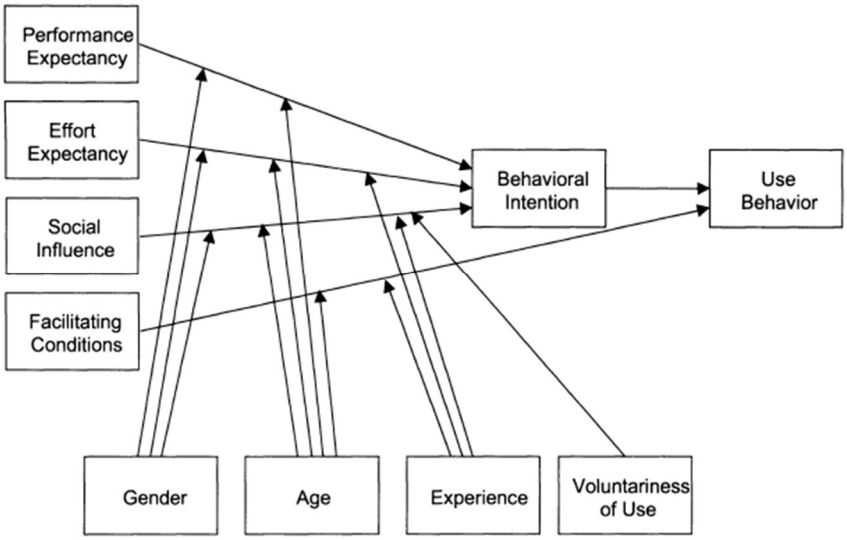
Source: Davis (1985), p 24

2.5 Technology Acceptance

Hence use and user satisfaction are crucial for success, they should be measured to evaluate the success and thereby the technology capacity of the university to deliver digital education. The concept of technology acceptance is one possible approach. There are different models to conceptualise technology acceptance. The Technology Acceptance Model (TAM) by Davis (1985) is frequently used to predict the actual use of any technology by individuals (Figure 1). The actual use is dependent on attitude towards using the technology. This argument is derived from the theory of planned behaviour, which states that the intention to use or do something is the most proximate predictor of the actual behaviour (Ajzen, 1991). Attitude/intention is influenced by the perceived ease of use and the perceived usefulness. The former influences the latter, while both are independently influenced by external factors. Prior studies have confirmed the validity of the TAM (Abdullah, Ward, & Ahmed, 2016; Al-Gahtani, 2016; King and He,2006 in Abdullah & Ward, 2016).

Figure 2

Unified Theory of Acceptance and Use of Technology



Source: Venkatesh et al., 2003,p.447

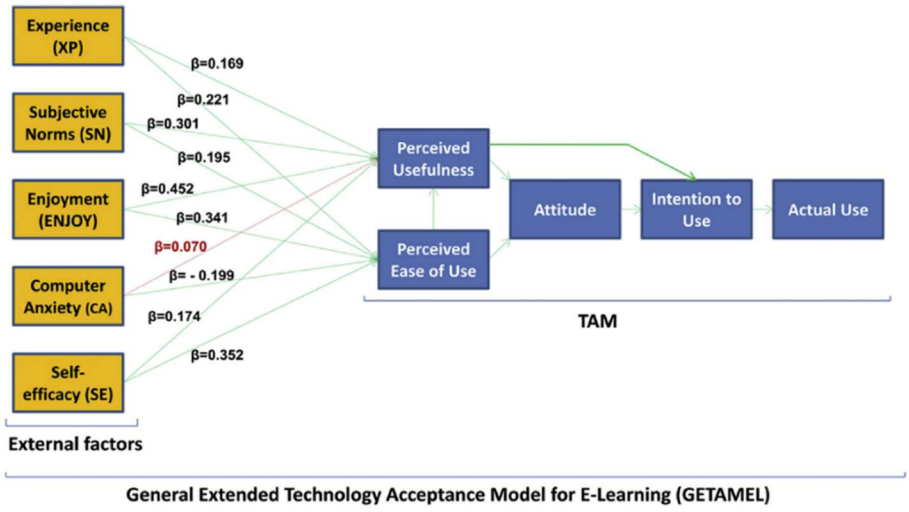
This model was extended and modified by Venkatesh and colleagues in 2003. They tested different possible external factors and their moderates, which were not specified in the TAM. The Unified Theory of Acceptance and Use of Technology (Figure 2) in its original version has excluded the items *Perceived Usefulness* and *Perceived Ease of Use.* Attitude is called behavioural intention and is influenced by the external factors *performance expectancy, effort expectancy, social influence* and *facilitating factors*. Those are moderated by gender, age,

experience and voluntariness of use. This model was validated and theoretically extended over the course of over ten years and in cross-cultural contexts. It was extended with new constructs, moderating factors and combined with other models (Ahmad, 2015).

In their pursuit of a novel, useful and applicable model for the acceptance of technology in the e-learning context, Abdullah and Ward (2016) developed the General Extended Technology Acceptance Model for E-Learning (GETAMEL, Figure 3). It is based on a meta-analysis of studies using the Technology Acceptance Model (TAM). It aims at identifying the most influential and significant external factors used in different studies. They identified *experience, subjective norms, enjoyment, computer anxiety* and *self-efficacy* as those. In their model, those five are added to the extended TAM variables *perceived ease of use, perceived usefulness, attitude and intention to use*. Chang, Hajiyev & Su (2017) applied the GETAMEL in an Azerbaijani context and developed a questionnaire including the moderating variable (Appendix 1). Studies carried out in Tanzania and China validated the model further (Kimathi & Zhang, 2019; Jiang et al, 2021). The latter was specifically researching e-learning during the Covid-19 pandemic. In the following, the used variables and the derived hypothesis are introduced and visualised (Figure 4). They are comparable to those formulated by Chang et al. (2017) but are rephrased on LMS for this study.

Figure 3

The General Extended Technology Acceptance Model for E-Learning including the effect size.



Source: Abdullah and Ward, 2016, p.246

2.5.1 Subjective norm (SN)

Venkatesh and colleagues (2003) define *subjective norm* as an individual perception of whether subjectively important people think a certain behaviour should or should not be performed. Concerning the LMS usage of students it is therefore important which opinions peers and teachers have or what the universities policies are. They as well as the original GETAMEL propose that SN not only has a direct and positive influence on PU and PEOU but on BI as well (Venkatesh et al., 2003). This study hypothesises:

H1: SN positively and significantly influences PU for LMS.

H2: SN positively and significantly influences PEOU for LMS.

H3: SN positively and significantly influences BI to use LMS.

2.5.2 Experience (EXP)

The next variable of the GETAMEL is *experience*. Concerning computers, it is defined as "the amount and type of computer skills a person acquires over time " (Smith et al., 1999, p. 227 in Abdullah & Ward, 2016). The more experience the more likely a person is to have a positive perception of *perceived ease of use* and *perceived usefulness* of computers or in the case of this paper LMS. Therefore:

H4: EXP positively and significantly influences PU for LMS.

H5: EXP positively and significantly influences PEOU for LMS.

2.5.3 Perceived Enjoyment (ENJOY)

The third external factor is *enjoyment* and refers to the extent to which the pure usage of a system is perceived as enjoyable regardless of the performance consequences (Park, Son et al., 2012 in Abdullah & Ward, 2016). A higher perception of enjoyment of LMS usage is related to a positive impact of *perceived usefulness* and *perceived ease of use* and thereby on the behavioural intention (e.g., Cheng, 2012; Yang & Li, 2011 in Abdullah & Ward, 2016). This study proposes that:

H6: ENJOY positively and significantly influences PU for LMS.

H7: ENJOY positively and significantly influences PEOU for LMS.

2.5.4 Computer Anxiety (CA)

An external factor with a generally negative connotation is *computer anxiety*. It is the individual tendency to fear current and coming computer usage (Igbaria & Parasuraman, 1989 in Abdullah & Ward, 2016). It is related to the avoidance of e-learning and therefore expected to have a negative influence on LMS usage as well. Following this, it can be hypothesised that:

H8: CA negatively and significantly influences PU for LMS.

H9: CA negatively and significantly influences PEOU for LMS.

2.5.5 Self-efficacy (SE)

The item *self-efficacy* is defined as the judgement of an individual to be capable to perform a specific task (Bandurea, 1982, p.391 in Abdullah & Ward, 2016). The higher the self-efficacy the higher the actual use following the argumentation described above. In the context of e-learning, this implies that a higher e-learning self-efficacy leads to higher chances of using e-learning (Yuen & Ma, 2008; Moghadam & Bairamzadeh, 2009; Hsia & Tseng, 2008; Lee, 2006 in Abdullah & Ward, 2016). The specific e-learning task in this study would be the usage of the LMSs in question. Therefore, this study hypothesis:

H10: SE positively and significantly influences PU for LMS.

H11: SE positively and significantly influences PEOU for LMS.

2.5.6 TAM variables

The model includes besides the external factors the original TAM variables. Davis (1985) defines *perceived usefulness* (PU) as "the degree to which an individual believes that using a particular system would enhance his or her job performance" and *perceived ease of use* (PEOU) as "the degree to which an individual believes that using a particular system would be free of physical and mental effort."(both p.26). Those two influence the attitude which refers to the evaluative effect a person performs before forming an intention. (Fishbein & Ajzen, 1975 in Davis, 1985). In the original GETAMEL by Abdullah & Ward, this attitude influences the behavioural intention. This intention is an individual's intention to perform a behaviour (Azjen, 1991). In the application of Chang, Hajiyev & Su (2017) and Kimathi & Zhang (2019) the item attitude was not included. This seems logical since it can be argued that the intention includes the attitude and therefore measuring the intention is enough to predict the actual use.

H12: PEOU positively and significantly influences PU.

H13: PU positively and significantly influences BI to use LMS.

H14: PEOU positively and significantly influences BI to use LMS.

2.5.7 Technology innovativeness as a moderator (TI)

One possible mediator variable was used by Chang et al (2017). It is called *technology innovativeness* and describes the individual belief or perception of technology as beneficial (Midgley & Dowling, 1987 in Chang et al., 2017). It is expected to moderate the influence of subjective norms on perceived usefulness and perceived ease of use as well as their relationship with behavioural intention (Chang et al., 2017).

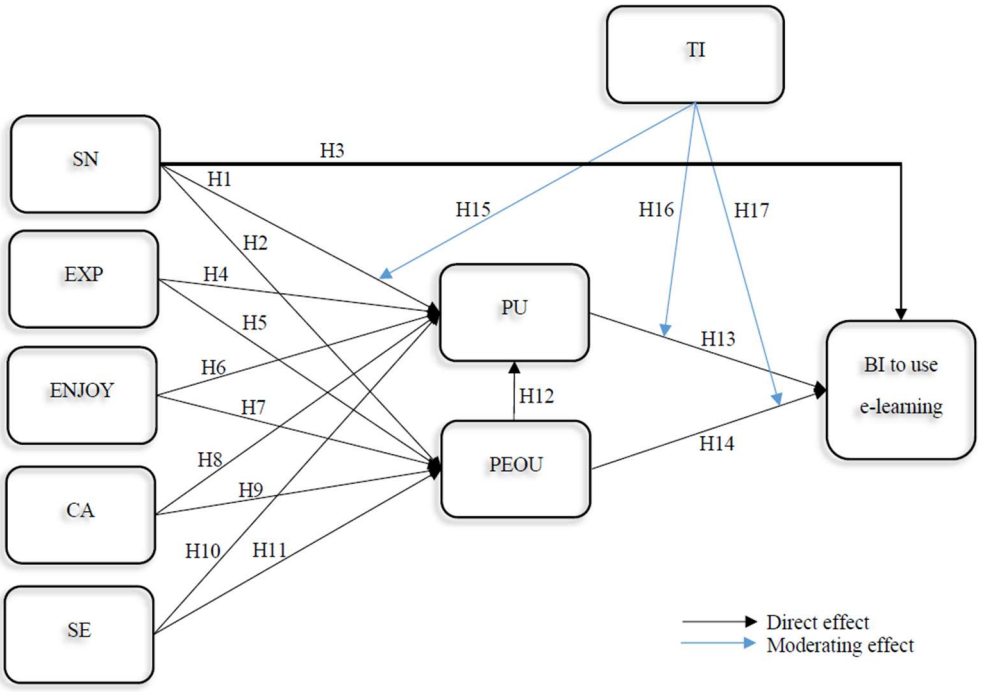
H15: TI moderates the relationship between SN and PU.

H16. TI moderates the relationship between PU and BI to use LMS.

H17. TI moderates the relationship between PEOU and BI to use LMS.

Figure 4

The conceptual model of GETAMEL including the hypothesis



Source: Chang et al., 2017, p. 133

In summary, the theoretical framework in this paper argues that performance on the organisational level can be measured utilizing the individual level. The education delivery of

universities as a public service in the process of digital transformation can be evaluated using the technology acceptance and LMS rating and usage by students. The aforementioned GETAMEL is a suitable way for measuring acceptance since it was specifically designed for e-learning. To apply it in a verified manner Chang et al.`s (2017) hypothesis and questionnaire can be reframed on LMS and reused. This general knowledge of technology acceptance and thereby a sense of the actual use of the LMS can be used as a baseline for the rating of the service delivery in the form of offered LMS. The past research created insight into possible categories students look at when rating a LMS. Those can be used to detect the reasons for the specific rating. So, combining the technology acceptance as a baseline and predictor of actual use with the rating of the specific LMS and their underlying reasons creates an extensive picture of the students` perception of the service delivery in terms of digital products and capacity of the university and thereby its organisational performance.

3.Methods

This section explains the methodological approach of the study, the research design, the case study selection, the sources of the collected data, and the form of data analysis.

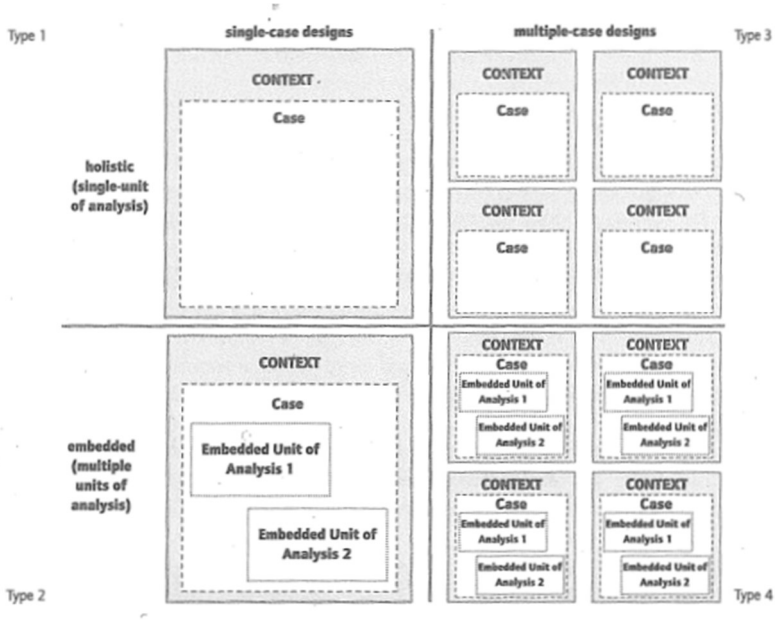
3.1 Case description

Based on the theoretical framework, "Public Governance across Borders" (PGaB) student`s technology acceptance will be analysed and a rating of the LMS used in the program conducted. The program is a three-year Bachelor of Science and aims at providing students with the ability to solve administrative problems on the international level. It is described as an interdisciplinary and bi-national program with a European perspective. The first year takes place in Münster and the second and third year in Enschede. In Germany, the program is organised in semesters of six months and in the Netherlands in modules of approximately ten weeks each. During their time in Münster, the students follow classes in political science, while in Enschede courses of the "Management, Society and Technology" program(MSnT) are followed (Institut für Politikwissenschaften, 2022; University of Twente, 2022b). MSnT students will not be included in the sample, since they are not part of the PGaB program. PGaB students are exposed to the LMS Learnweb used by the University of Münster extensively in the first year. They do not have any other LMS experience within the program at that point. After the transition to the University of Twente, PGaB students have access to the LMS Canvas and will use this for their second year of studies. The Learnweb access is still granted during year two and three since some students might retake courses from year one or opt for the option to follow courses at the University of Münster in the first half of year three. Alternatively, students might be exposed

to the LMS of other universities during their ERASMUS exchange in the same period. For two of the three years students, have access to Learnweb and Canvas simultaneously, while the latter is used to a larger extent. The cohorts of 2019,2020 and 2021 were exposed to varying social distancing rules and off-campus online lectures due to the Covid-19 pandemic. It can therefore be argued that students of those cohorts have a distinctly different experience of LMS usage since it was a more prominent part of their studies.

Figure 5

Basic Types of designs for Case Studies



Source: COSMOS Corporation in Yin (2014), p.50

Following Robert Yin`s (2018) classification this design can be categorised as an embedded single-case design (Type 2 in Figure 5). It consists of a context, a case and two units of analysis. The program is a unique example of a joint degree and therefore is part of the *unusual rationale*, which is a perquisite for the *single-case* design. The *embedded* option is chosen since Learnweb on the one hand and Canvas on the other hand are each a unit of analysis. The case is the group of students from the cohorts 2010,2020 and 2021 due to their distinct Covid-19 experience. The broader context is the program itself.

3.2 Data collection

The data will be collected using the survey tool “Qualtrics”, which the University of Twente has a license for. The survey questions will be derived from the questionnaire developed by Chang et al. (2017). It includes all items from the GETAMEL model and their moderating variable (Appendix 1). Only the wording was changed from “the e-learning” to “e-learning

platforms" to make it more appropriate for the topic of this paper and the tense of each statement was converted to present or future (Appendix 2). As a form of convenience sampling a link to the survey will be distributed through the WhatsApp groups of each cohort. It can be expected that most enrolled students are part of those groups since they are frequently used to exchange information or ask questions to fellow students. All answers will be given on a seven-point Likert scale from strongly (dis-)agree, (dis-)agree, somewhat (dis-)agree and a neutral point. As assessed by Joshi et al. (2015) this symmetric scale increases the chances of meeting the objective truth by allowing a more nuanced answer by the participants. Before the questions, participants will be provided with information on the research and must give consent to participate. Even though they are not part of the external factors in the GETAMEL model the demographics age and gender as well as year of study will be asked and used as control variables later. After the GETAMEL-related questions, students are asked to rate both LMS on a scale of 1 (worst) to 7 (best). As a last question, participants can give their reasons for the rating on the platforms. This questionnaire and procedure were approved by the ethical review committee of the University of Twente. The data was collected anonymously. Participants were not forced to answer all questions and could end the survey at any time.

Before the launch of the survey, a pre-test with 9 participants was conducted to detect misspellings or unclear instructions. After correcting for those the survey was published and opened between the 2nd and 9th of June 2023. 65 participants started the survey, while 59 completed the multiple-choice part of the GETAMEL, 53 the rating of Canvas and 52 the rating of Learnweb. The open question regarding Canvas was answered by 54 while the one on Learnweb 49.

3.3 Data analysis

The collected data will be analysed in a mixed-method approach. This entails the analysis of data by integrating qualitative and quantitative methods (Tashakkori & Creswell, 2007). In the first step, a quantitative analysis to test the hypothesis will take place using the statistical program "R Studio". The hypothesis tested are those mentioned earlier by Chang et al. (2017) in the Theory section. The latent variables of the GETAMEL will be operationalised the same way as in their study (Appendix 1). They will be analysed by combining the means of each measured variable of each latent one into one index. For *Computer Anxiety* the measured variable CA.1 had to be recoded since it was coded inversively in the questionnaire. The analysis technique used in the paper is multiple linear regression. This is the last and simplified step of the structural equation modelling (SEM) technique used by e.g., Chang et al. (2017) to

validate the GETAMEL. SEM allows to test construct validity, model fitting as well as hypothesis testing (Mueller & Hancock, 2019; Ullman & Bentler, 2012; Chang et al., 2017). Due to an expected small N the structural regression step will be replaced by multiple linear regression to measure the relationships between the variables as close as possible to the original path strengths. Since Chang et el., 2017 already tested the measurement model with several different indicators only a power analysis will be done.

This study will add three control variables to the GETAMEL variables, namely *Gender, Age* and *Year* of study. Prior research detected that gender is a key barrier to acquiring digital skills. Female respondents tend to have a lower level of self-assessment concerning digital skills than male respondents (Kamberidou, 2019; Aristovonik et el., 2020; Hargittai & Shafer, 2006 all in Zaimakis & Papadaki, 2022). While *Age* controls for experience with digitalisation in general, *Year* accounts for the fact that year 3 students have more experience with those specific LMS. In both cases, it can be expected that a higher number of accounts for a bigger impact on the respective independent variable.

The regression will be run over 12 different models(Table 1). The first model (PU) has the external factors as independent and *Perceived Usefulness* as a dependent variable. In the second model (PU controlled) the control variables *Gender, Age* and *Year* will be included. Models three (PEOU) and four (PEOU controlled) repeat the same procedure on *Perceived Ease of Use*. In model five (TAM) the *Behavioural Intention* will be predicted by *Perceived Ease of Use* and *Perceived Usefulness* as derived from the original TAM, while in model six (TAM controlled) the control variables are added again. The moderation analysis is done in models seven to twelve. It will be controlled whether *Technology Innovativeness* moderates the relationship between *Subjective Norm* and *Behavioural Intention, Perceived Usefulness* and *Behavioural Intention* as well as between *Perceived Ease of Use* and *Behavioural Intention.* Each once without and once including the control variables above.

In the second step, the answers to the two open questions at the end will be analysed using textual analysis and coding. This is a typical qualitative approach. Since there is no prior study conducting textual analysis on students` perspective on LMS this paper opts for the *in vivo* coding approach. Here the codes are directly derived from the text and the interpretation of the researcher (Benaquisto & Given, 2008).

Table 1

Regression and moderation models with name and logic

Name	Logic
Regression	
PU	PU=SN+EXP+ENJOY+CA+SE
PU controlled	PU=SN+EXP+ENJOY+CA+SE+Gender+Year Age
PEOU	PEOU=SN+EXP+ENJOY+CA+SE
PEOU controlled	PEOU=SN+EXP+ENJOY+CA+SE+Gender+Year+Age
TAM intern	PU=PEOU
TAM intern controlled	PU=PEOU+Gender+Year+Age
TAM	BI=PU+PEOU
TAM controlled	BI=PU+PEOU+Gender+Year+Age
Moderation	
SN	BI=SN*TI
SN controlled	BI=SN*TI+Gender+Year+Age
PU	BI=PU*TI
PU controlled	BI=PU*TI+Gender+Year+Age
PEOU	BI=PEOU*TI
PEOU controlled	BI=PEOU*TI+Gender+Year+Age

Source: own creation

In the first step of Ruona`s (2005) proposed scheme the data will be transcribed in an orderly manner. By reading and rereading those the researcher starts to familiarise themselves with the data and develops first ideas of codes and concepts. The ideas are sharpened in the third step, the coding. In this paper, coding is used to create broader categories, which are interpreted in the fourth step. These categories have a label, a definition and examples and are found in Appendix 3. The codes will be marked as positive/negative and added to a score per category. The coding itself was done twice by the researcher to check for intra-coder reliability. This ensures consistency within the codes used (Van den Hoonaard, 2008). The last step is the interpretation of the coding results.

Even though there is no prior research directly looking into students' perspectives of LMS, the categories used in this analysis can be linked to it (Appendix 3). The category *design* refers to the aesthetics of the respective platform and is one of Kathser & Kathser`s (2022) LMS requirements. Another requirement of their study is *usability* and was mentioned by Grossi and colleagues (2018) as well. It is the second category used in this study. This category contains every aspect of the actual way of using the platform in the day-to-day life of the students. One

aspect inherent to the OCED`s definition (2005 in Navehl, 2010) is *communication* and will therefore be used as another category. It includes every way to use the respective LMS to communicate from student to teacher, student to student and teacher to student. Three categories explicitly mentioned by students in Thoring et al.`s study (2017) were *study organisation, interoperability* and *usage by teaching staff.* The first describes the accessibility of information and the enrolment process into courses. It is part of the OCED (2005 in Navehl, 2010) definition, too. The second category contains all aspects of connection and integration of other essential services with the LMS. The term itself was used by Grossi et al (2018). Everything that is referring to the way the university and the teacher use LMS features and organise the course is part of the *usage by teaching staff* category. The last category is called *technical features* and is comprised with everything that relates to technical aspects and (dis-)functions of the LMS. Of course, one can argue that every aspect of a LMS is technical, since every action is a digital code and technologically connected, but the distinction between several categories allows for a more nuanced picture of students' attitudes. Moreover, the students do not have any access to the underlying coding system or administration of the LMS, so looking at them from a merely technical perspective is not representative of the students' perspective.

4.Analysis

In this section the results of the data collection described above will be presented and analysed. Each sub-question will be answered in one subsection. First the platforms rating will be examined. In the next step the hypothesis testing takes place. Lastly, textual analysis of the open question will be performed.

4.1 Platform rating

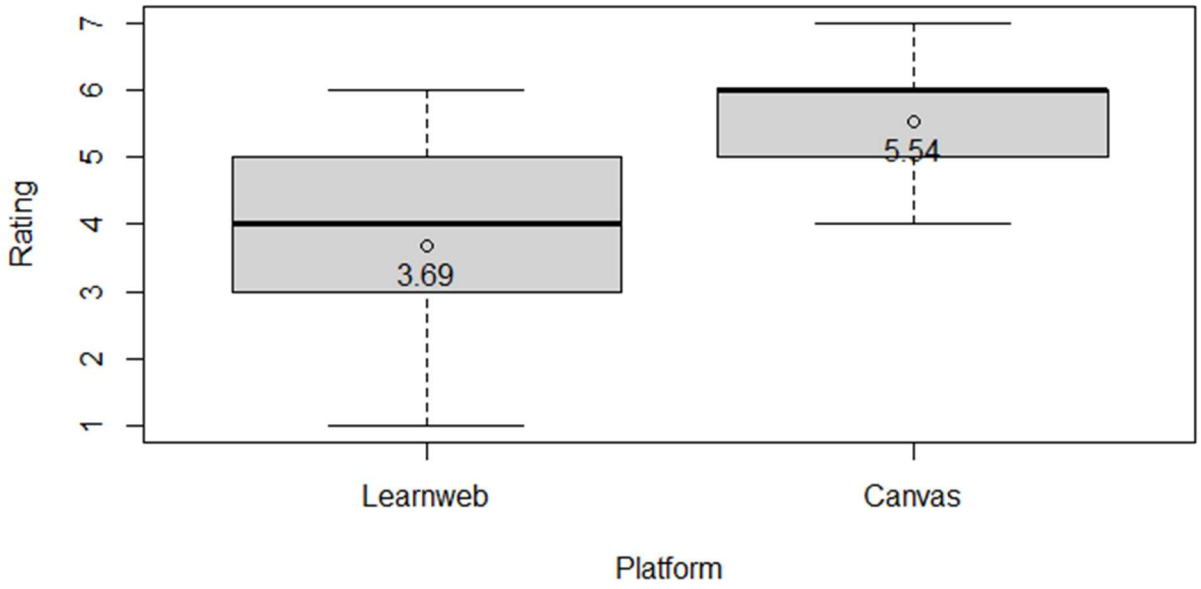
To compare the ratings of the two platforms those were transformed into a boxplot, which allows to compare different indices (Figure 6). Learnweb has a minimum of 1 and a maximum of 6 as a rating and thereby a range of 5. The first quantile ranges from 1 to 3, the second from 3 to 4, the third from 4 to 5 and the last from 5 to 6. There are no outliers to report. The median rating is 4, while the mean rating is 3.69. The rating of Canvas has a minimum of 4 and a maximum of 7. With 3 the range is smaller than the one of Learnweb. Its first quantile lies between 4 and 5, the second between 5 and 6, the third is 6 and the last is between 6 and 7. The median and the third quantile are both 6. The mean of the Canvas rating is 5.54.

The first sub-question can subsequently be answered that students rate the platforms differently and Canvas higher than Learnweb. The average rating is higher, the minimum is higher and the

maximum as well. The bigger range of Learnweb implies that the students perceive it as much more diversely than Canvas. One thing that makes the difference clear is the fact that the upper end of the third quantile of Learnweb equals the lower end of the second quantile of Canvas.

Figure 6

Boxplot of the ratings of Canvas and Learnweb including the mean



Source: own data and creation

This means that 75% of the students' rate Canvas higher than 75% of the students rate Learnweb. The reasons for this difference will be analysed in section 4.3.

4.2 Technology Acceptance

Before answering the second sub question different steps will be taken. First, the intra-construct reliability needs to be tested. In the second step, an overview in the form of descriptive statistics will be given, followed by a correlation check. The next step is the regression analysis itself and the last is the moderation analysis. All the missing values were excluded from the dataset.

4.2.1 Intra-construct reliability

All variables from the GETAMEL are latent and consist of 2-3 measured variables (Appendix 1). To control for unreliability the internal reliability needs to be test. The most used measurement for intra-construct reliability is Cronbach`s Alpha. It ranges from 0-1. As reported by Streiner (2003) values higher than 0.6 are acceptable, higher than 0.7 good, and higher than 0.8 very good. Values above 0.9 indicate redundant items within that construct. Following this categorisation, the variables *Subjective Norm* (α=0.89), *Enjoyment* (α=0.88), *Self-Efficacy*(α=0.85) and *Technology Innovativeness* (α=0.85) have very good internal reliability.

The items *Perceived Ease of Use*(α=0.79) and *Behavioural Intention* (α=0.74) report good internal reliability, while the one of *Experience* (α=0.68) is only an acceptable one. Even though the α of *Computer Anxiety* is slightly below the threshold of acceptable (0.58) it will still be included in the analysis to keep the GETAMEL and its questionnaire complete. Table 2 gives an overview of those values.

Table 2

Cronbach´s Alpha of the latent variables

Variable	α
Subjective Norm (SN)	0.89
Experience (EXP)	0.68
Enjoyment (ENJOY)	0.88
Computer Anxiety (CA)	0.58
Self-Efficacy (SE)	0.85
Perceived Usefulness (PU)	0.80
Perceived Ease of Use (PEOU)	0.79
Behavioural Intention (BI)	0.74
Technology Innovativeness	0.85

Source: own data and calculation

4.2.2 descriptive statistics

From table 3 a general overview of the sample can be gained. Most of the participants identify as female (69.23%), 20 participants as male and no one as non-binary. 41 participants and with 63.08% most of them are in their third year of the program. 15 in the second and 9 already graduated. The age of the participants ranges from 19 to 27 years old. The mean age is 22.38 years old. Regarding the variables it can be reported that the average *Experience* of the sample is quite high with a mean of 5.96. The average *Computer Anxiety* is in comparison relatively low (mean=2.26). Except for *Technology Innovativeness* (mean=3.93) is no variable on average below the neutral point of 4 and therefore positive. With no standard deviation higher than 1.62 it can be stated that the data is distributed coherently around the means.

Table 3

Descriptive statistics (N=65)

Variable	Min	Max	Mean	s.d.	Frequency
SN	1	7	4.32	1.25	
EXP	1	7	5.96	0.79	
ENJOY	1	7	4.59	1.07	
CA	1	7	2.26	0.87	
SE	1	7	4.99	1.32	
PU	1	7	5.18	0.92	
PEOU	1	7	5.18	0.92	
BI	1	7	5.78	0.73	
TI	1	7	3.93	1.35	
Age	19	27	22.38	1.62	
Gender					
Male					20
Female					45
Year					
2					15
3					41
Already graduated					9
Total					65

Source: own data and estimation

4.2.3 Bivariate Correlation

To gain a first impression of how the variables are statistically connected a correlations matrix is helpful (Table 4.2). In this paper, the correlation matrix is based on Pearson's r. This measurement is a standardised value for the correlation between two variables and ranges from -1 to 1. 1 characterises a perfect positive correlation, -1 a perfect negative correlation and 0 no correlation at all. Table 4.1 displays the thresholds set by Quinnipiac University (in Akoglu, 2018) for political science.

What is visible from the correlation matrix is that from the external factors *Experience* correlates with 3 other ones significantly. On a moderate positive level with *Enjoyment* (r=.43**), a moderate negative level with *Computer Anxiety* (r=-.47**) and on a weak level with *Self-Efficacy* (r=.28*). This seems logical, since having used LMS in past might have been enjoyable and created the feeling of the capability to handle LMS, which might decrease the

anxiety of future use. Similarly, *Self-Efficacy* and *Computer Anxiety* correlate negatively and moderately.

Table 4.1

Interpretation of Correlation Coefficients

Correlation Coefficient	Interpretation
0.00 ≤ r≤0.1	No correlation
0.1≤ r≤0.2	Negligible
0.2≤r≤0.3	Weak
0.3≤r≤0.4	Moderate
0.04≤r≤0.6	Strong
0.6≤r≤0.9	Very Strong
0.9≤r≤1	Perfect

Source: Quinnipiac University in Akoglu (2018), p. 92

Among the TAM variables *Perceived Ease of Use* correlates with 3 from the external factors significantly. Positively and strongly with *Experience* (r=.52**) and *Self-Efficacy* (r=.65**) and strongly and negatively with *Computer Anxiety* (r=-.45**). This means that one might perceive LMS usage as easy if one has experience with it, is confident in one's ability and does not fear computers. In addition, do *Perceived Ease of Use* (r=.33*)and *Behavioural Intention* (r=.42**) correlate with *Perceived Usefulness*. The moderator variable *Technology Innovativeness* correlates with all variables except *Perceived Usefulness* and *Subjective Norm* on a significant and minimum moderate level. The former indicates weak or no results from the moderation analysis derived from theory and performed under 4.2.4. From the control variables, *Gender* has four significant correlations, *Year* two and *Age* only one. Being female correlates weakly or moderately and negatively with *Perceived Ease of Use* (r=-.34*), *Behavioural Intention* (r=-.33*) and *Technology Innovativeness* (r=-.43**). The *Year* of the program relates positively with *Self-Efficacy* (r=.44**) and *Perceived Ease of* Usefulness (r=.34*), while *Age* has only a significate correlation with *Year* (r=.31*). This is logical since one can expect that the higher the year of study the older the students. To check for multicollinearity a Variance Indicator Factor (VIF) test of all variables was performed but did not show any problematic results.

Table 4.2

Correlation matrix (N=65)

Variable	1	2	3	4	5	6	7	8	9	10	11
SN											
EXP	.14										
ENJOY	-.18	.43**									
CA	.03	-.47**	-.14								
SE	-.19	.28*	.07	-.34*							
PU	-.06	-.08	.19	-.09	.22						
PEOU	.02	.52**	.23	-.45**	.65**	.33*					
BI	.13	.11	.04	-.11	.09	.42**	.17				
TI	-.00	.56**	.39**	-.56**	.35*	.22	.43**	.36**			
Year	.01	.12	-.02	-.13	.44**	.18	.34*	-.19	.01		
Age	.07	.19	.08	-.19	.06	.15	.23	-.01	.13	.31*	
Gender	.01	-.16	-.18	.32*	-.24	-.20	-.34*	-.33*	-.43**	.13	-.02

Note. * indicates $p < .05$. ** indicates $p < .01$.

4.2.3 Regression and moderation analysis

To have sufficient model power the sample size must be big enough. Even though usually a prior power analysis is conducted this paper opted for a post hoc analysis. The reason is that there was no alternative to increase the sample size. The students from year 1 do not have the comparative experience and the students who graduated two years ago might not remember details from their usage. For this power analysis the tool G*Power was used. Based on the sample size of N=65, an α-error probability (falsely rejecting the null hypothesis) of 0.05 and 8 predictors (including the control variables in models PU controlled and PEOU controlled) the power of our sample is 0.51. This translates to a 50% chance of incorrectly rejecting the alternative hypothesis (Faul et al., 2007). This underpoweredness must be kept in mind when interpreting the results.

Table 5

Regression analysis (N=65)

Predictor	*PU*	*PU controlled*	*PEOU*	*PEOU controlled*	*TAM intern*	*TAM intern controlled*	*TAM*	*TAM controlled*
Intercept	5.48**	3.91	1.17	-0.05	3.48**	2.96	4.17**	4.99**
Independent variable								
SN	0.08 (0.12)	0.06(0.08)	0.09(0.12)	0.07(0.09)				
EXP	-0.44*(-0.38)	-0.44*(-0.37)	0.29(0.25)	0.30(0.25)				
ENJOY	0.29*(0.34)	0.26(0.31)	0.00(0.09)	0.05(0.06)				
CA	-0.13(-0.13)	-0.07(-0.07)	-0-14(-0.14)	-0.08(-0.08)				
SE	0.19(0.28)	0.14(0.21)	0.38**(0.56)	0.34**(0.50)				
PU							0.30**(0.41)	0.30**(0.41)
PEOU					0.33*(0.33)	0.24(0.24)	0.03(0.04)	0.04(0.06)
Control variables								
Gender (ref.=Male)		-0.28(-0.15)		-0.28(-0.15)		-0.25(-0.13)		-0.28(-0.20)
Year		0.19(0.11)		0.11(0.06)		0.17(0.09)		-0.33(-0.25)
Age		0.08(0.130)		0.06(0.11)		0.04(0.06)		-0.00(-0.01)
Model fit								
R^2	.161	.204	.576**	.607**	.109*	.132	.181**	.300**
Adjusted R^2	.07	.056	.53	.534	.019	.058	.147	.224

Note. * indicates $p < .05$. ** indicates $p < .01$. Values in brackets are standardised coefficients.

After having established intra-construct reliability, and non-multicollinearity, detected several correlations and conducted a power analysis multiple regression can be performed. Table 5 lists all the coefficients from the models mentioned under 3.3 with standardisation, p-value and R^2 as a model fit measure.

The baseline *Perceived Usefulness* of LMS within the sample is significant and relatively high (5.48**). *Experience* has a significant but negative effect on PU (-0.44*), while *Enjoyment has* a significant and positive effect (0.29*). If controlled for *Gender, Age* and *Year*, *Perceived Enjoyment* loses its significance as well as the *Perceived Usefulness*. *Experience* remains significant. Therefore hypotheses 1,4,8 and 10 can be rejected. Hypothesis 6 can be accepted if not controlled for *Gender, Year* and *Age.* The negative influence of *Experience* on *Perceived Usefulness* in this sample must be highlighted and will be discussed later. The control variables are not significant and both models (PU & PU controlled) have a non-significant model fit.

The models including the *Perceived Ease of Use* in contrast have a relatively high model fit. They can explain 57% (PEOU) and even 60% (PEOU controlled) of the variance. None of the external factors is significant except *Self-Efficacy*, regardless of controlled or not. Hence, hypotheses 2,5,7 and 9 must be rejected. Hypothesis 11 can be accepted.

If looking at the models of the original TAM (TAM & TAM controlled), it can be stated the baseline *Behavioural Intention* of PGaB students is on a significant level of 4,17 or 4,99 if controlled and that *Perceived Usefulness* has a significant, positive effect on regardless of being controlled (0.30** in both cases).PEOU itself has no significant influence on BI. Hypothesis 13 can be accepted, while Hypothesis 14 must be rejected. The model goodness is significant but relatively small. The TAM itself can explain 18% of the variance and if extended by the control variables 30%. The relationship between *Perceived Usefulness* and *Perceived Ease of Use* is only significant when no control is present (0.33**) and this model has no explanatory power. Hypothesis 12 can be partially accepted.

In the next step hypothesis 15,16,17 will be controlled using moderation analysis (Table 6). Even though the models including *Subjective Norm* and *Perceived Usefulness* have significant explanatory power of variance, no significant moderation effect is measured. All three hypothesis must be rejected. Again, the control variables have no significant effect.

Table 6
Moderation effect of TI on relationship with BI

Predictor	SN	SN controlled	PU	PU controlled	PEOU	PEOU controlled
(Intercept)	3.75**	4.97**	2.72*	2.98	4.89**	5.48**
Independent variable						
SN	0.34	0.30				
PU			0.50	0.62*		
PEOU					0.05	0.09
TI	0.45*	0.38	0.47	0.58	0.22	0.19
Moderation						
SN:TI	-0.07	-0.06				
PU:TI			-0.06	-0.09		
PEOU:TI					-0.01	-0.01
Control variables						
Year		-0.18		-0.31		-0.25
Gender (ref.=Male)		-0.24		-0.26		-0.24
Age		-0.02		0.00		0.00
Model fit						
R^2	.183*	.238*	.272**	.369**	.113	.203
Adjusted R^2	.132	.137	.227	.285	.079	.097

Note. * indicates $p < .05$. ** indicates $p < .01$.

The results of the regression analysis can be summarised, and the second sub-question can be answered in the following manner: The only two external variables which influence the *Perceived Ease of Use* and the *Perceived Usefulness* of LMS by PGaB students are *Experience* and *Self-Efficacy.* The effect of the former contrasts with theory and hypothesis. The *Behavioural Intention* of those students cannot be predicted by PEOU but only by PU while the latter has an influence itself. There is no moderation by *Technology Innovativeness* as theorised by Chang et al.(2017) among PGaB students.

4.3 Textual analysis

The answers to the two open questions of the questionnaire were analysed with a simple coding method. Table 7 displays the categories with total frequency and positive or negative

connotations for each platform.

Table 7
Categories and their respective positive and negative mentioned frequency

	Frequency			
	Positive		Negative	
Category	Canvas	Learnweb	Canvas	Learnweb
Design	9	1	0	25
Usability	58	13	10	29
Communication	6	0	7	6
Study Organisation	11	4	5	6
Interoperability	1	0	2	9
Usage by staff	1	0	3	7
Technical features	12	5	14	8
Total	98	25	41	90

Source: own data, estimation and design

As already visible under section 4.1 Canvas is overall rated higher than Learnweb. The textual analysis supports this. Canvas was mentioned with a positive connotation as often as Learnweb with a negative one (Canvas 98, Learnweb 90).

When looking at the category design Learnweb is mentioned ten times more with a negative connotation than with a positive one and thereby the second most frequently mentioned negative category. The students often describe Learnweb as not aesthetically pleasing or "ugly" (No.31, Appendix 5) as well as "old-fashioned and boring" (No.9, Appendix 5). Canvas on the other hand is seen more positively in this category. With a frequency of 9, it is set on the fourth place of positively mentioned categories. Its design is described as "modern" (No.3, Appendix 4) or "pleasant" (No.7, Appendix 5) and with a "nice layout" (No.34, Appendix 4). Both platforms have a design feature for certain occasions. Learnweb can displays snow on the interface in winter times (No.3, Appendix 5) and Canvas confetti when a paper was submitted (No. 28, Appendix, 4).

The biggest difference can be found in the category *usability*. It is the most frequently mentioned positive category of Canvas (58 times) and the most frequently mentioned negative category of Learnweb (29 times). Canvas is perceived as "easy to use" (No. 1, Appendix 4),

with a “good structure” (No.6, Appendix 4) and as “intuitive” (No. 52, Appendix 4). Learnweb in comparison is seen as “not intuitive at all”(No. 6, Appendix 5) and “hard to navigate “ (No. 36, Appendix 5). Other students perceive the platform as easy and accessible (e.g., No. 19 & 22, Appendix 5). One student (No 12, Appendix 5) likes that it is not used extensively, and information is provided separately via mail. There was no pressure to digitalise. What students criticise about the usability of Canvas is that it has so many features that it feels crowded, overwhelming and complicated at times (e.g., No. 10, 13 & 21, Appendix 4).

The communication features were not mentioned very often but for Learnweb only in a negative context. Students complain that there is no communication via the platform and that notifications, which would contact teachers easier like in Canvas (No. 18,33.38, Appendix 5; No. 7, 12, 21, Appendix 4). There is an integrated online lecture function like Canvas’ BigBlueButton missing (No. 32, Appendix 5). Even though Canvas has these features they are also negatively perceived. The notification function does not work properly and sends out notifications multiple times per event which is seen as annoying (No 13,22,41, Appendix 4).

In terms of organising one’s studies Canvas scores again higher than Learnweb. Especially the display of deadlines and assignments as well as the grades are mentioned as positive functions of Canvas (e.g., No. 3,11,14, Appendix 4). The latter one is also criticised as being “weird”(No. 50, Appendix 4) or “confusing” (No. 15, Appendix 4). What was positively mentioned about Learnweb is the course display per semester and clear course descriptions (No. 14 & 32, Appendix 5). The self-enrolment in courses on the other hand was viewed as “tiresome” (No.5, Appendix 5).

If *interoperability* was mentioned then as a negative point of Learnweb. The need for other platforms like myWWU for mail and QISPOS for exam enrolment and grading was criticised (e.g., No.25,27, Appendix D). The same is true for the necessity of OSIRIS at the University of Twente (No 5, 29, Appendix C).

A similar pattern is visible concerning the usage of the platforms by teachers and staff. The usefulness of Learnweb is very dependent on the usage by the teacher, which in comparison to Canvas is not very uniform. On the contrary, it seems to be different for every course (No. 21, Appendix D).

Only in the category *technical feature* Canvas has more negative than positive connotations. One of the two main problems is the non-accessibility of the groups feature via the app, which makes it necessary to use a laptop or computer to enrol in groups for projects or the bachelor’s

circle (e.g., No. 15 & 53, Appendix 4). The second issue is the log-in procedure via the 3-step authentication, which makes Canvas less accessible (e.g., No. 30,35 & 45, Appendix 4). BigBlueButton and the pdf download are not always functioning. The app of Canvas itself is perceived as positive and useful (e.g., No. 6,15 & 20, Appendix 4). The non-existence of a Learnweb app was the most frequent negative comment regarding technical features (e.g., No.19,25 & 42, Appendix 5).

To answer the third sub-question, it can be stated that the reasons for the different ratings of the platforms are the different perceptions of each platform. While Canvas is perceived as useful, optical pleasing and helpful in terms of study organisation, Learnweb is perceived as less handy, aesthetically not pleasing and poorly integrated into the grading and enrolment structure of the University of Münster. Both platforms have functioning issues at times.

5.1 Conclusion

In this case study the question *How do students affected by Covid-19 related off-campus teaching rate the Learning Management Systems of their universities based on their technology acceptance?* was addressed. To answer it, bivariate and multiple regression as well as simple textual analysis were executed. The results indicate that "Public Governance Across Borders" students, which were affected by off-campus Covid measures, rate the LMS Canvas higher than the LMS Learnweb. The most important categories students use to rate the platforms are *design, usability, technical features* and *study organisation*. From the student's technology acceptance can be derived that *Experience* negatively influences the students' *Perceived Usefulness* while *Self-Efficacy* positively their *Perceived Ease of Use*. This itself determines the *Perceived Usefulness.* The *Behavioural Intention* of LMS is determined by the students' *Perceived Usefulness.* The formulated hypothesis can mostly be not accepted. This study can only partially validate GETAMEL and the predecessor TAM. If framing out on the organisational level this study finds the University of Twente performs better than the University of Münster in the public service delivery of education in terms of online learning and evaluated from a student's perspective. Consequently, the University of Twente poses a higher technology capacity.

5.2 Discussion

The first thing that can be discussed is the negative effect of *Experience* on *Perceived Usefulness*. The theory expects it to have a positive influence (Chang et al, 2017; Abdullah & Ward, 2016). One thing that comes to mind is the influence of study progress and age on experience. This cannot be supported since those do not significantly correlate with experience

(Table 4.2). Even though the ratings of the platform (Table 1) indicate that Learnweb is rated worse, and one could assume that the experience of having used Learnweb frames the perception of usefulness negatively, this is not plausible. The influence of LMS experience is measured by the item *Self-Efficacy* not *Experience.* There must be undetected factors which influence the experience of using computers. One thing might be that the pressured "digitalisation" mentioned by Pohlenz et al. (2023) caused by the Covid-19 measures overwhelmed students or annoyed them. Thereby framing a computer or LMS usage in general negatively. Another possibility is the timing of the survey. 63% of the participants are from year three and were writing their bachelor`s thesis at that time, which might have a similar effect on their attitude towards computer usage in general. An idea formulated by Jiang et al. (2021) suggests using *Experience* as a moderator rather than an external variable.

One thing that was likely influenced by the experience of LMS usage is the positive relationship between *Self-Efficacy* and *Perceived Ease of Use.* It can be argued that the students know their way around LMS after having used at least two of them and therefore being confident in their abilities of LMS usage. The contrast between Learnweb and Canvas is probably a factor as well. After having used Learnweb for one semester the switch to Canvas made the students realise how much "better" a LMS can be and thereby bettered their attitude towards LMS in general, which was measured in the item *Self-Efficacy*. It is debatable how the rating and the influence of SE might have changed if the students first used Canvas and then Learnweb or if students from year one without the comparative experience were included. What is also important to consider is the longer active usage (at least 1,5 years)of the better-rated platform (Canvas).

If looking at the results of Thoring et al.`s (2017) study it is surprising that the category interoperability was not mentioned more often as a negative aspect of Learnweb. Especially considering the higher interoperability of Canvas. One possible answer to that puzzle might be the student's realisation that the general online education and administration of the University of Münster is much more decentralised, which a website for each service (e-mail, course registration, grades and LMS). Alternatively, it bothers the students in this sample less than those asked by Thoring and colleagues (2017). Moreover, students could also have accepted that grades and course/module registration and the LMS course are separated after having that experienced in Münster and Enschede.

A further thing that is discussable is the connection between the original TAM variables. For this sample of PGaB students, those are connected in a cascade. PEOU and PU are not on the level of influence. PEOU influences PU, which in turn determines BI and thereby the actual

use. In real life, this means that students lock first on the easiness of usage and then on the usefulness of the LMS before forming an intention to use the LMS.

Despite correlating with many of the variables *Technology Innovativeness* did not have a significant moderation effect at all. This leads to the assumption that it might be better off as an external variable of the GETAMEL. The same can be observed for all three control variables. Other control variables like per day usage of the LMS or general electric device usage as well as family background and accessibility of digital devices come to mind if thinking of alternatives.

5.3 Limitation

The main limitation of this study is its underpowerdness due to insufficient N. The statistical significance, the explanatory power of each model and thereby the number of influential coefficients might be higher. The question is whether that is feasible with the PGaB program. Following G*Power testing GETAMEL with possible three control variables, $\alpha = 0.05$ and $\beta = 0.95$ would require a sample size of at least 160, which is not realistic out of the three cohorts of year 2, year 3 and the recently graduated. One way to circumvent that problem is the inclusion of year 1 students. But those must be excluded from all questions regarding the comparison. The undepowerdness leads to a problem already mentioned by Jiang et al. (2021). The overcomplexity of GETAMEL for specific contexts like this one. The less complex TAM would need a sample size of 109 if calculated with G*Power using the same parameters as above. This sample size seems more realistic for the PGaB case. If the focus on a specific program would be lifted, both sample sizes are realistic. This could be done for example when comparing two or more universities in terms of students' technology acceptance as multi-case research. An even bigger sample size would allow for the application of the Structural Equation Modelling technique to account for the complexity of GETAMEL.

The methodological choice of the online survey comes with the limitation of control of the survey situation. The participants could fill out the survey where- and whenever they wanted to. If the person was in a stressful surrounding like a busy train or a loud café the overall attitude could be more negative and therefore the answers less positive, even though the person is more positive toward the topic in other situations.

Additionally, must be stated that even though the scope of the study included the impact of Covid-19 it could not control for it. Every participant was affected by anti-Covid-19 measures at some point in their studies. A comparison sample from non-affected was not included. The

impact of Covid-19 is hard to measure since the restrictions varied over time and place. A question asking about the impact could account for this shortcoming.

Further must be kept in mind that the author himself is part of this program. Despite having not participated in the survey and his attempt to be as neutral as possible, biases in the coding and interpretation might occur. This can never be ruled out completely (Ruona, 2005).

5.4 Further research

This study contributed to the existing research by testing the GETAMEL in a joint degree context and combining it with a rudimental textual analysis. Further research should aim at a bigger sample of another joint degree to ensure testing hypothesis using SEM. Furthermore, a need for an up-to-date model for e-learning usage of students with fewer variables to be applicable in small sample size settings like this one is needed. Moreover, the task of detecting external factors influencing the intention to use eLearning is not over. This study calls for more research on e-learning or university performance in general from a student's perspective. A follow-up study could of this paper could conduct more in-depth interviews with students. Generally, a mixed-method approach regardless of the setting is preferred to also detect the specific reasons behind the students' attitudes towards e-learning.

5.5 Practical implications

To rule out dissatisfaction of students with the LMS provision of both universities completely all negatively mentioned aspects had to be tackled. This is not a realistic short-term prospect. Both universities, but especially the University of Münster, should develop a guideline on how to structure the course and create a uniform standard template of an ideal course, in which teachers only must fill in the specific content. This would make the LMS much more usable, understandable and clear Another short-term aspect is the functioning of the platforms. Higher server capacity might increase the seamless usability of both platforms. In the long run, both should aim at creating a centralised platform including course content, deadlines, assignment upload, grading, enrolment and communication. To avoid confusion after transitioning from Münster to Enschede and to account for the uniqueness of this program, its grading and content as well as the cooperation of two universities a PGaB-specific platform would be ideal. The realisability of this idea is debatable. Nevertheless, both universities should aim to deliver student-friendly Learning Management Systems. The fewer students spent on figuring out platforms the more enjoyable and thereby productive is their study experience.

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Appendix 1. Questionnaire developed by Chang et al. (2017) including their source.

Subjective norm (SN) (Abdullah et al., 2016)

SN1. People who influence my behavior would think that I should use the e-learning.

SN2. People who are important to me would think that I should use e-learning.

Experience (EXP) (Abdullah et al., 2016)

EXP1. I enjoy using computers.

EXP2. I am comfortable using the internet.

EXP3. I am comfortable saving and locating files.

Enjoyment (ENJOY) (Abdullah et al., 2016)

ENJOY1. I find using e-learning enjoyable.

ENJOY2. The actual process of using the e-learning is pleasant.

ENJOY3. I have fun using the e-learning.

Computer anxiety (CA) (Abdullah et al., 2016)

CA1. Computers do not scare me at all.

CA2. Computers make me feel uncomfortable.

CA3. Working with computer makes me nervous.

Self-efficacy (SE) (Abdullah et al., 2016)

SE1. I am confident of using the e-learning even if there is no one around to show me how to do it.

SE2. I am confident of using the e-learning even if I have never used such a system before.

SE3. I am confident of using the e-learning even if I have only the software manuals for reference.

Perceived usefulness (PU) (Davis, 1989)

PU1. Using the e-learning would allow me to accomplish learning tasks more quickly.

PU2. Using the e-learning would improve my learning performance.

PU3. Using the e-learning would enhance my effectiveness in learning.

Perceive ease of use (PEOU) (Davis, 1989)

PEOU1. Learning to use the e-learning would be easy for me.

PEOU2. I would find it easy to get the e-learning to do what I want it to do.

PEOU3. My interaction with the e-learning would be clear and understandable.

Behavioral intention (BI) (Venkatesh & Bala, 2008; Venkatesh & Davis, 2000)

BI1. Assuming I had access to the e-learning, I intend to use it.

BI2. Given that I had access to the e-learning, I predict that I would use it.

BI3. I plan to use the e-learning in the future.

Technology innovativeness (TI) (Ngafeeson & Sun, 2015)

TI1. If I heard about a new information technology, I would look for ways to try it out.

TI2. Among my peers, I am usually the first to try out new information technologies.

TI3. I like to experiment with new information technologies

Appendix 2. Questionnaire used in this survey.

Subjective norm (SN)

SN1. People who influence my behaviour would think that I should use e-learning platforms.

SN2. People who are important to me would think that I should use e-learning platforms.

Experience (EXP)

EXP1. I enjoy using computers.

EXP2. I am comfortable using the Internet.

EXP3. I am comfortable saving and locating files.

Enjoyment (ENJOY) (Abdullah et al.,

ENJOY1. I find using e-learning platforms enjoyable.

ENJOY2. The actual process of using the e-learning platforms is pleasant.

ENJOY3. I have fun using the e-learning platforms.

Computer anxiety (CA)

CA1. Computers do not scare me at all.

CA2. Computers make me feel uncomfortable.

CA3. Working with computers makes me nervous.

Self-efficacy (SE) (Abdullah et al., 2016)

SE1. I am confident of using the e-learning platforms even if there is no one around to show me how to do it.

SE2. I am confident of using the e-learning platforms even if I have never used such a system before.

SE3. I am confident of using the e-learning platforms even if I have only the software manuals for reference.

Perceived usefulness (PU)

PU1. Using e-learning platforms allows me to accomplish learning tasks more quickly.

PU2. Using e-learning platforms improves my learning performance.

PU3. Using e-learning platforms enhances my effectiveness in learning.

Perceive ease of use (PEOU)

PEOU1. Learning to use e-learning platforms is easy for me.

PEOU2. I find it easy to get e-learning platforms to do what I want it to do.

PEOU3. My interaction with e-learning platforms is clear and understandable.

Behavioural intention (BI)

BI1. Assuming I had access to e-learning platforms, I intend to use it.

BI2. Given that I had access to e-learning platforms, I predict that I would use it.

BI3. I plan to use e-learning platforms in the future.

Technology innovativeness (TI) (Ngafeeson & Sun, 2015)

TI1. If I heard about a new information technology, I would look for ways to try it out.

TI2. Among my peers, I am usually the first to try out new information technologies.

TI3. I like to experiment with new information technologies

Appendix 3. Coding scheme

Category	Definition	Codes	Example	Source
Design	Refers to the aesthetical and optical design of the platform	Design, layout, feeling, interface, snowflakes, confetti	"modern design" "unclear layout" "Bad looking interface" "confetti when submitting papers"	Kathser & Kathser, 2022
Usability	Refers to the way the students feel about the actual usage of the platforms	Overview, intuitiveness, structure, handling, findability, clarity, accessibility, understandability, usability, shortcuts	"great overview" "really intuitive" "easy to understand" "could be a bit overwhelming" "really unstructured" "easy to use"	Kathser & Kathser, 2022; Grossi et al., 2018
Communication	Refers to the ability of the platforms to communicate with teachers and class mates	Notification, communication, e-mails, online lectures	"no notifications or communication on the platform" " (online lectures) had some issues" "10+notification for a single remark"	OCED,2005 in Navehl, 2010
Study organisation	Refers to features which helps students to organise their studies	Accessibility of Information, grades, deadlines, exams, to-dos, sign-in, enrolment, groups feature, all-in-one	"one can access important information" "and presents all Information easily accessible" "There is a lot less information" "enrol in the courses is tiresome"	Thoring et al., 2017; OCED, 2005 in Navehl, 2010
Interoperability	Refers to the connection and integration of the respective platform with other essential websites or services	connection to other platforms, usage of other platforms, necessity of other platforms, integration of other platforms	"use external sides instead of using the learnweb" "I HATE that you still need to use other platforms" "would be great if Osiris would be included." "connected to microsoft account"	Thoring et al., 2017; Grossi et al., 2018
Usage by teaching staff	Refers to the way the teachers organise the courses and make use of	Usage by teacher, course organisation by teachers, support by uni, conformity	"the operators (staff) sometimes add confusing aspects" "conformity because all professors/staff have to use it the same way/"	Thoring et al., 2017;

	the features of the platforms		“helpfulness depends heavily on professor”	
Technical features	Features of the platforms which are of technical nature as well as explicitly mentioned technical features by students	Provider, download, technical problem, upload, shortcuts, Log-in, functions, app, notification, Snowflakes, confetti, multiple accounts, mobile usage	“I also dislike the login system” „no video tool” “no app” “integrated upload function” “mobile application”	Kathser & Kathser, 2022

Appendix 4. Answers to the open questions regarding Canvas

No	What do you like/dislike about Canvas
1	Easy to use, great overview
2	i liked the course structure display in learnweb better i like the integrated upload function, having the grades and everything else all in one system
3	Modern design, really intuitive, shows your to dos/deadlines, grades
4	I like that it is self-explanatory and a well-known email platform. It allows to manage multiple accounts, which made my e-learning experience in my semester abroad very easy, as my host university used Canvas too.
5	In General (applies to both platforms) I would prefer it if everything would be collected on one platform (e.g. grades, course registration)
6	Like: good structure, mobile apication dislike Reliance on 3rd party software (e.g Microsoft)
7	The design is pleasant and the files, modules, courses are organized in a way that is very intuitive and pleasant as well. There are many functions, which I like (i.e. messaging others directly) however some of the functions are difficult to figure out at first which led me to not use them at all (organizing a BigBlueButton meeting for a group project)
8	Easy to navigate, intuitive
9	I think both platforms are suited for educational purposes. However, I think that Canvas leads to more conformity because all professors/staff have to use it the same way/ the way the materials are shown is more similar. I didlike about Canvas that it is not very handy to use on a mobile phone - neither the app nor the website.
10	embedded videos, everything in one place, could be a bit overwhelming to some I guess but I found the structure quite clear. There was one thing about the Groups feature that was a bit complicated but unfortunatley I don't remeber what exactly it was. The embedded live video function (online lectures) had some issues. Sometimes you had to join several times before you could here the audio. Also, the design was just ugly and not very user friendly. I much prefer Zoom.
11	- Canvas messages do not work properly - getting an overview is often hard - endless scrolling - like: list of assignments on the side
12	- simplicity of dashboard - Streaming Option (BBB) - Direct contact via messages

13	Canvas has many functions (like groups, message system, etc.) but that also makes it difficult sometimes because there are too many options. I also dislike the login system. It is always a pain to get the 2FA and being on the phone app is also not an enjoyable user expierience. The pdf/PPP download function is also quite annoying. It first opens up in the browser. Additionally, it is annoying that often documents (like texts etc.) are not provided directly as a PDF doc. But thats probably on the profs side rather than on the learning platform. If a teacher/prof changes something in the class I get like 5 emails which is really annoying and not helpful.
14	I like the clear structure, that it is easy to understand and that it gives many different options to use it. I like that you have every information on canvas and mostly don't need other platforms for your studies.
15	like: app with notifications, upload section for assignments (makes me happy to see the confetti after each upload), easy to handle dislike: notifications do not always work, sometimes grades or points for an assignment are indicated in a confusing way, every teacher uses it in a different way which makes it confusing, not everything can be used/seen in the mobile version, e.g. groups
16	i like the look and the handling, it is easy to find things and you have an overview over most of your personal information as well as tasks. I dislike that depending on how much information/courses/files are on there it can get a bit tricky to find what you are looking for.
17	Vetter overview an structure
18	I had a hard time finding the different sub menus
19	No shortcuts to most frequently used courses
20	It is very clear structured and I can find most things without great effort. I have an app installed on all my mobile devices which makes it esy to access stuff from everywhere. Although I must say that I dont know whether there is an App for Learnweb, but I never used one. Tbh I dont have anything that I dislike about Canvas the only thing that I can think of that it is about Uni stuff.
21	it's easy to understand + usable as an app + notifications + sometimes it's a little crowded and you have to scroll through -
22	-Sometimes 10+ notifications for a single remark posted on in. -Enoying to log in again after a certain amount of days past
23	Easy to handle
24	Module overview is good
25	Different modules are separated, structure is clear, but difficult to work across different modules
26	Good structure, easy application
27	The categories (assignments, modules…) do not really make sense.
28	nice overview, good structure, good support for different kinds of content formats, inclusion of deadlines, grades and other organizational information, confetti when submitting papers, helpfulness bit dependent on professor

29	The platform is clear, one can access important informations about the courses and grades/assignments. Sometimes I am unsure where exactly to find certain things, because there are several ways to upload information, a little more clarity on this would be better and I would like to have the ability to view all mails there. And would be great if Osiris would be included.
30	The basic design is intuitive, however, some features are hard to find. The dual authentication process is quite unnecessary in my opinion, especially since such a security feature is not in place for Osiris which can be used to register/deregister for courses.
31	Canvas is very intuitive and presents all Information easily accessable. The Plattform only itself offers a good structure, only the operators (staff) sometimes add confusing aspects in their added data/ structure
32	Easy handling, good overview.
33	Often issues with notifications displayed as unread despite them being read
34	easy to use nice layout
35	You always need to do 2 Level Authentification
36	+ there is an app + assignment deadlines good overview + is connected to microsoft account -> emails and notifications + bigbluebutton
37	The content is easily accessible. All features are clearly visible and there are no hidden functions. A messaging system included makes the communication with teachers much easier.
38	I think it was nicely designed and is easy to use, I am not so much a fan of the video conference feature of canvas (bigbluebutton)
39	I liked the Interface
40	Easy to use. All the Information in one Place
41	- sometimes the same notifications are send out multiple times
42	First of all the fact that Canvas has an app makes it far easier to access all the important informations from your phone if needed. The Layout is also mich clearer and more interactive/ intuitive.
43	It’s clearly structured and easy to access.
44	I like how quick and easy it is possible to open files and slides.
45	I don’t like the extra security checks which makes it hard to get access to the website when your phone is not around
46	It's structure and accessibility. Especially the main page where you can see all of tour courses. I also like that there is an app for your smartphone.
47	very flexible in adapting it to own needs
48	Certain sections of the user interface are unintuitive, the arrangement/layout is different from how I would have found it most sensible. It is rather exhaustive and very comfortably organizable however.
49	- it gives a good overview about the learning topics especially concerning which topics have been dealt with in which lecture

50	The grading is weird
52	Intuitive, self-explanatory, organized and inclusive (grades, video, materials)
53	the structure of canvas is somewhat unstructured with many folders that have different content and are sometimes difficult to find. However, you can use it as in app which makes is very easy to access information.
54	I like the design of the platform. What I don't like is that you can only get to the "Groups" button when you open Canvas from your laptop. This function is not available on the cell phone.

Appendix 5. Answers to the open question regarding Learnweb

No	Q34
1	What do you like/dislike about Learnweb
2	Really old-fashioned, don't like the design, but still you can find everything you need
3	It is not as intuitive as Canvas and still feels a big outdated and left behind in terms of new updates and technological possibilities.
4	The snowflakes in winter
5	like independent platform dislike somewaht oldish gui feels clunk at times
6	The design could be better, it is actually quite unenjoyable to look at. The organization of the courses and their names are not intuitive at all and the fact that one has to find key/password to enroll in the courses is tiresome. But overall, it is manageable and one will be able to understand and navigate learning through it.
7	Not as intuitive, not as clear. Professors use it where differently, i.e. files are always in different places and difficult to have quick overview
8	I like about Learnweb that it can be used with phones or laptops. I think the design could be a bit more intuitive
9	Looks old-fashioned and boring, no motivation to learn
10	- platform as a whole often does not work - like: sorting of courses into semesters and seperate folders
11	- unhandy dashboard - often messy lecture platforms (too many unsorted links)
12	It is way easy to handle. It has limited functions but that makes it so simple. Finding my courses, the classes, and lectures were simple and the way was well structured. Additionally, login in and using it in all browsers worked without a problem. I also liked that the handling of the learn platform. If something was really important and email was send. There was no pressure to "digitalize" every part of communication/learning expierience just for the sake of it. The handling was in done a reasonable way. The only thing that was missing was some tools like Kahoot/Quizlet that we used in lectures but had to use external sides instead of using the learnweb website.
13	I like that you can find your course informations on learnweb and can download the information given from your teacher (e.g. readings) What I don’t like is that the system seems very old and doesn’t have a clear structure. Many times there a technological problems on Learnweb, what makes it not enjoyable to use. And I HATE that you still need to use other platforms like myWWU etc to check your grades and other informations. Especially compared to canvas Learnweb is way harder to use and is less effective

14	like: clear structure (at least during my two semesters in Münster), certain information that was important over and over again, e.g. links for zoom, had a dedicated section where they could be found dislike: grades are registered in another programme (at least in 2020/21 that was the case)
15	I like that once you select a course, you can directly access most information regarding that specific course. Generally however I dislike that there is no clear overview, there is no direct calendar with assignments or lectures. I feel like it is less extensive, and you need multiple platforms to get ahold of you data and so on.
16	There is a lot less information than on Canvas, like deadlines for example
17	Old features/mock up
18	Learnweb was also quite well structured but not as good as Canvas. What I dislike is that the Uni in Münster is not always accessible for any help/advise on when you are struggling. Also when we had to write exams during Covid there were a lot of technical issues on Learnweb which was quite frustrating.
19	easy to understand + usually no notifications or communication on the platform -
20	-Unstructured or over complicated -No app, no functioning mobile version -compared to canvas its extremely outdated
21	HATE that everything is different for every course
22	Easy and quick access to my courses and everything I need to know about them
23	Not as clear but easier to jump from one course to another
24	Complicated design
25	very poorly structured, helpfulness depends heavily on professor (concerning given information, structure of contents etc.), a lot of study related information is on other platforms
26	I don't like Learnweb that much. But it's more because of the professors or lecturers who upload things in an unclear way. One can't always see when you have which assignments and it's generally difficult to find information. The professors should deal with it more. It would also be better if Qispos was included, the mails would be accessible and learnweb should become available as an app.
27	The design could be clearer. It could have more features and should be more integrated/connected with/to other platforms of the University to make it more user friendly.
28	Learnweb seems very old and not very intuitive in its controls. It is accesible but has a Bad looking interface and leaves out many options to make the use of the platform easier. It does its Job but is very unpleasant to use
29	The user surface is unpleasant. Not many usefull features
30	design very straight foreward but at times not very intuative but most issues arise from the beaurocratic issues with the plattform in combination with QISPOS
31	ugly

32	Bad overlapping with Quispos and unclear responsibilities of both platforms
33	- you have to sign up for your classes yourself - no video tool-> have to use Zoom - Not aesthetically pleasing + semester unabhängige kurse good overview; inclusion of other Information such as fachschaft, erasmus etc.
34	There is a lack of structure on the Learnweb application. It is hard to navigate, as there are various tabs where the purpose is unclear. With this platform, I feel like I need an excessive introduction. In addition to that, there is no sufficient way to communicate with teachers.
35	Learnweb is also easy to use depending on how well the lecturer has designed their course. I think that designwise it could be made a little more pleasent
36	I found it really hard to navigate in learnwrb
37	Easy to use, but Canvas is Even easier/better and more clear.
38	- the design is sometimes very confusing (unübersichtlich) - it can be difficult to inscribe into courses, you need help with almost everything on this platform and it’s not handy at all
39	Learn web has an “old feeling” to it. it’s not very intuitive and has a rather unclear layout. Especially the “comment” and interaction section on Learn web is almost confusing. Moreover, the fact that the it’s only a website is very unpractical for the students. Since it has no notifications, it’s easy to miss messages or other important communications
40	It is really unstructured and an outdated system in my eyes. It was mostly confusing to me have to use the platform appropriately.
41	I don‘t like that it is quite complicated to find courses.
42	Easy overview
43	Courses are harder to find and signing up for new courses is a bit more complicated. Also there is no app for Learnweb.
44	really structured, but not intuitive (still dont know how to sign up for courses..)
45	The user interface feels clunky and less than modern, especially the search option is hardly any help unless one writes out the course name perfectly. It lacks flexibility. It is however simple and easier on the eye.
46	There’s too much
47	Disorganized, no app (like canvas),
48	learnweb cannot be used as an app and must be opened via the browser. Using it as an app would be much more accessible. The structure itself gives a good overview over the different semesters and their related courses.
49	I don‘t like the design of this platform since it is very unstructured. You don't immediately know how to find your way around the platform.