How do students deal with forced digitalisation in teaching and learning? Implications for quality assurance

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Abstract
Purpose – This paper aims to investigate student subgroups’ responses to the coercive digitalisation of teaching and learning processes during the pandemic. Respective variance is discussed in terms of digital inequality and is interpreted as a need to individualise teaching and learning and quality assurance practices.

Design/methodology/approach – This study uses data from surveys (N = 955) on student perceptions of the introduction of emergency digitalisation – an important aspect of higher education. The authors perform latent class analyses to identify student subgroups. The students were asked to rate digital learning processes and their overall learning experiences.

Findings – The identified student subgroups are proponents, pragmatics and sceptics of digitalised teaching and learning processes. These subgroups have different preferences with regard to teaching and learning modes of delivery, which implies the relevance of individualised educational services and respective quality assurance practices to reflections on improvement needs.

Research limitations/implications – The data are from a single, typical German university; therefore, the scope of the results may be limited. However, this study enriches future research on the traits of student subgroups and students’ coping strategies in an ever-changing learning environment.

Practical implications – The findings may help individualise universities’ counselling services to enhance overall teaching performance and quality assurance practices in a digitalised environment.

Originality/value – The findings provide insights into students’ responses to the COVID-19 pandemic and its impact on teaching and learning. This paper enriches the research on student heterogeneity and relates this to development needs of quality assurance practice.

Keywords Coercive digitalisation, Latent class analysis, Teaching and learning, Individualisation, Latent class analyses

Paper type Research paper

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Introduction

Higher education quality is a multi-dimensional concept (Harvey and Green, 1993; Green, 1994). It materialises in the quality of organisational processes, as well as in the pedagogical capacities of teachers and in the contributions of learners to their academic achievement. Because the COVID-19 pandemic has disrupted the organisational and pedagogical framework under which higher education traditionally took place (El Masri and Sabzalieva, 2020), the framework for assuring the quality of such coursework needs to be reconsidered and adjusted to “the new normal” (Perrin and Wang, 2021).

Quality higher education results from an interplay of the above aspects (institutional, organisational, procedural, pedagogical and personal). In the sense that all of these factors are affected by the pandemic, it can be assumed that their interplay is also malfunctioning in several ways: the pedagogical capabilities of teachers need to be readjusted to the requirements of online teaching; examinations need to be aligned with new teaching and learning formats; students encounter new challenges with regard to the coercive shift to mobile learning spaces; and so on (Meyer, 2021; Rapanta et al. 2021).

To address these developments, the necessary adjustments of future frameworks for quality assurance need to be rearranged on an informed basis that specifically takes account of students’ increasingly heterogenous learning preconditions. The assumption, for instance, that an average student would have to be able to reach a certain learning goal within a prescribed period of time becomes less realistic. Instead, higher education practices – and, as a consequence, quality assurance practices – have to account for an increasing diversity of learner needs and their individual learning paths. Such a sensitivity to the growing number of individualised learning processes and the development needs of both teaching modes and quality assurance practices requires universities to develop a deeper understanding of how different subgroups of students respond to the changing learning environment. Thus, in this specifically disruptive era, knowledge on the sources, the specific nature and the trajectories of the impact that the pandemic has on the learning processes of increasingly diverse learners needs to be established. For this purpose, we emphasise the student perspective and investigate their response to the pandemic. We assume that even before the pandemic, moves towards individualisation and personalisation of learning processes could be observed, as well as a stronger focus on digital delivery of educational provisions (Teräs et al., 2020; Wieland and Kollias, 2020). This shift apparently has gained momentum during the pandemic, because digitalisation is no longer an exception and coping w’ ith turbulence has become part of the new reality (Ansell and Trondal, 2018).

If these assumptions hold, one could conclude that higher education institutions (HEIs) need to be more sensitive to individual learners’ needs, particularly in a digital learning environment (Laufer et al., 2021). This should increase researchers’ and managers’ attention to student heterogeneity and the management of heterogeneity as an emerging aspect of quality assurance (Mahat et al., 2014). To keep heterogeneity manageable for HEIs’ leaders, administrators need to know more about their target audiences (Tight, 2013). Hence, they need to be familiar with typical patterns of student learning behaviour and their responses to disruptive changes, such as “emergency digitalisation” (Giorgio et al., 2020, p. 3) in the aftermath of the pandemic, in contrast to the “continuous transformations” of previous times (Fonseca et al., 2015, p. 313).

Such knowledge may help leaders to tailor more responsive consulting services and adjustments of teaching practices and quality assurance procedures. Hence, the analyses in the present paper identify subgroups of students that respond differently to the challenges that HEIs are encountering during the pandemic, particularly with regard to the coercive digitalisation of teaching and learning processes. Foremost, emphasis is placed on students’
perceptions of the massive expansion of digital modes for teaching and learning in relation to quality assurance practices in higher education.

**Brief look at related literature**

Notwithstanding the plethora of studies on the impact of the COVID-19 situation on teaching and learning processes in higher education, the respective knowledge is not yet fully consolidated, not least because of the lack of meta-analytic studies (Bond et al., 2021). The available primary studies, however, suggest that student overall performance has increased (Iglesias-Pradas et al., 2021), notwithstanding difficulties to cope with online teaching (Bisht et al., 2020). Many studies address students’ mental and academic well-being (Deng et al., 2021), the impact on how students achieve within their learning processes and how teachers’ approaches to teaching are influenced (Guppy et al., 2021; Hew et al., 2020; Weidlich and Kalz, 2021). Moreover, students’ and teachers’ psychometric traits, such as self-efficacy (Bobade and Naik, 2021); organisational matters, for example, HEIs’ swift responses to the need to introduce or enhance online educational provisions (“coercive digitalisation”) (Bond et al., 2021; Laufer et al., 2021; Weidlich and Kalz, 2021); or socio-economic aspects, such as differences in the availability of proper tools, learning spaces and equipment for students’ successful participation in digital education as a determinant of their academic achievement (Chattaraj and Vijayaraghavan, 2021; Guppy et al., 2021), are under investigation, and recommendations on how to arrange up-to-date online teaching processes are being made (Bao, 2020).

So far, however, most primary studies fall short of relating these individual aspects to one another in favour of establishing a theory-driven knowledge base that could be used for universities’ systematic responses to the impact of the pandemic and, in particular, for a longer-term development of adjusted quality assurance strategies (Bond et al., 2021). In the remainder of the paper, we contribute to the literature and close these gaps by using empirical analyses of students’ responses to the coercive digitalisation and by interpreting these in light of the theoretical concept of digital inequality (DiMaggio and Hargittai, 2001).

In general terms, social inequality can be described as the limited access of social groups to desired means and resources for social reproduction as a result of their group characteristics or group membership (Bartlett and Burton, 2016, p. 280). However, such a basic concept of social inequality, which separates the “owners” from the “non-owners”, is not fully applicable to the research question of student populations’ responses to the forced digitalisation, because all students share the privilege of having access to higher education as such. Moreover, it can be assumed that – at least within the population of one university – there is comparable availability of digitalised educational services in terms of the technical requirements in the university’s catchment area. Thus, notwithstanding the existing inequalities regarding students’ learning conditions (family background, time-budgets, etc.), differences in their responses to digitalisation may not be rooted in the question of having or not having access to digital services as such, but rather in aspects that refer to the quality of the use of the digital environment.

DiMaggio and Hargittai (2001) take account of the need to expand the concept of the digital divide to digital inequality by introducing the autonomy of use, skills, social support, the purpose of the use and features of the equipment as important aspects to characterise differences in the conditions under which students respond to the changing circumstances in which teaching and learning take place. Hence, we consider digital inequalities between students as not only a technical problem that could be resolved with the provision of resources (Soomro et al., 2020), but as the intersection of technical and social factors that can be characterised as a technical-social mechanism and a social reinforcement mechanism. For
example, the distinction between rural and urban regions belongs to the technical-social mechanism. The regional affiliation sets the borderlines for the digital divide, with rural areas exhibiting less developed technical infrastructures (Lembani et al., 2020; Soomro et al., 2020). In this sense, the digital divide also emanates into society, because individuals living in rural areas have less experience with digital devices and other online tools. Moreover, the social reinforcement mechanism emphasises the relevance of ethnicity, socio-cultural capital and other factors. Hence, individuals who become socialised in groups with high socio-cultural capital tend to develop durable coping strategies, reveal higher ambiguity and frustration tolerance and exhibit lower anxiety and higher learning skills (Struyven et al., 2005).

Following our line of argumentation, we assume that the two mechanisms presented above influence students, their perception of higher education quality, their attitudes and their coping strategies with changing learning environments and coercive digitalisation. Furthermore, we assume that this has meaningful implications for (future) views on and preferences for teaching and learning. Particularly, the second assumption is relevant for quality-related questions because digitalisation may be considered an additional and cross-cutting topic that needs to be addressed to understand the quality of teaching and learning. High-quality classroom teaching does not necessarily lead to high-quality interactions in a virtual classroom. Therefore, a better understanding of students’ responses to digitalised teaching and learning and the respective effects of digitalisation may contribute to adjusted quality assurance procedures.

Research design, methodology and data set
The present study draws on survey data from a typical medium-sized German university that is also characterised by a large regional catchment area to attract students (including urban and remote areas). The case university accommodates around 14,000 students and has some 1,200 academic and non-academic staff. Its nine faculties have a focus on engineering sciences, but do also pursue research and higher education in natural sciences, humanities, business and medicine. The respondents in sample for the present study were selected across all faculties.

We consider the identification of student subgroups and their unique features as an important aspect for managerial decisions on adjustments of teaching and learning practices. Particularly, when management decisions are made on taking further steps into the development of a digitalised teaching and learning environment, it is necessary to find out if the changes that have been imposed by the pandemic require longer-lasting adjustments or if things could “go back to normal” once the crisis has been overcome.

Our analytical model suggests that membership in different student subgroups is a function of a range of aspects of digital inequality. In particular, we assume that differences in the student groups can be found with regard to their attitudes towards their study and digitalisation in broader terms, with regard to their assessments of the learning conditions they were encountering at the beginning of and during the pandemic and with regard to their perceptions of challenges that were associated with the swift turn to digital teaching and learning environments. The identification of student subgroups as such has already been used in many research contexts: modelling student subgroups supports the assessment of marketing strategies (Bonnema and van der Waldt, 2008) and of the conditions of student learning achievements (Flumerfelt et al., 2007; Riggert et al., 2006). Also, in the context of student responses to digital learning, studies have been performed to systematise differences between groups, not least with regard to their social backgrounds (Dumford and Miller, 2018). Student subgroups in the present study are expected to constitute “digitalisation
types” that may exhibit their different preferences with regard to future conceptions of teaching formats, social interaction and learning processes. Hence, even these preferences are shaped by the technical and social components of digital inequality (see Figure 1).

The data were collected during the summer semester of 2021. All students who were enrolled in the second semester of a regular (six-semester) bachelor’s programme, a state examination programme (e.g. medicine) and a master’s degree programme were included, yielding a sample of 955 students (adjusted response rate: 13.8%). Respondents were invited to complete the questionnaire on a voluntary basis. The procedure was in line with the university’s standards for research ethics and with relevant European regulations on data security (European General Data Protection Regulation). The questionnaire consisted of 35 questions covering topics such as the level of information on studying at the university prior to enrolment, aspects of digital everyday life during the COVID-19 pandemic, social integration in the academic life of the university, occupational aspirations and socio-demographic information. Finally, 19 variables were included in the present study.

The main characteristics of our sample are as follows: 53.5% of the responding students are female, and 46.5% are male. On average, the students are 23.5 years old (standard deviation = 3.96). Moreover, 58.5% are enrolled in an undergraduate degree program; 41.5% are pursuing a master’s degree. Half of all respondents are studying in a science, technology, engineering or mathematics degree program; another 28.2% study humanities, while 13.7% are enrolled in business and economics programmes. Students of medicine make up 7.5% of the sample.

Our analysis follows a two-step procedure (see Figure 1). In the first step, we empirically generate the student digitalisation types using an exploratory latent class analysis (LCA; performed with Mplus, version 6). The basic assumption of this particular multivariate statistical procedure is that the data include a number of unknown latent classes that represent certain classification characteristics of latent groups (Collins and Lanza, 2010; Lanza et al., 2012). Such latent groups and their classification characteristics are empirically tangible. Hence, the latent classes are constructed as a representation of the meaning behind the structure of the empirical data. LCA or – in broader terms – research strategies aiming to cluster student sub groups have been used in a range of research fields, such as students’ risky health behaviours, their epistemic beliefs and study success and personal traits (Postareff et al., 2016; Lonka et al., 2020; Hutchesson et al., 2021).
In the present case, the theoretically relevant classification features for the identification of the student digitalisation types are the students’ attitudes towards online teaching, their ratings of individual learning contexts and their perceptions about challenges of the forced shift to online teaching (rated retrospectively in the survey we performed during summer term 2021; see Table 1).

This part of our analysis contributes to the existing body of knowledge about the challenges and difficulties students encountered in association with the rapid introduction of online teaching, particularly during the pandemic. In a second step, we investigate the preferences of the identified student types regarding teaching and learning to relate the identified student subgroups with relevant aspects of digital inequality.

Data analysis, results and discussion

LCA identifies the relevant student subgroups (“digitalisation types”) using model tests and comparisons to extract the adequate number of classes. In the present case, we compared model solutions with two to five latent classes. Our data structure suggests that a model with three classes reveals the best model quality and fit according to criteria like the absolute and the relative model fit. This three-class solution needs relatively few parameters and replicates an existing typology extracted in a prior investigation (Berndt et al., 2021), providing the basis of the further analyses and interpretations in the present study (Collins and Lanza, 2010; Lanza et al., 2012). For this purpose, we describe the three identified subgroups as proponents, pragmatics and sceptics of digitalisation in teaching and learning.

Latent class 1, the proponents of digitalisation (Figure 2), contains 35.7% of all students, according to the estimated parameters. As a test of the quality of this assessment, the conditional response probability (manifest classification) can be calculated. This measure estimates the likelihood that a particular response will occur, in correlation with an individual’s membership in a particular class (Collins and Lanza, 2010). As a result, a marginal deviation from the above presented proportion can be found when assigning individuals based on the highest response probability (36.4%, \( n = 343 \)). A respondent is classified as a proponent when probability values of \( p > 0.8 \) are observed for the answer

| No. | Variable                                                                 | Average value | SD  |
|-----|--------------------------------------------------------------------------|---------------|-----|
| (1) | Online teaching will permanently gain in importance                      | 3.93          | 1.03|
| (2) | In the future, I would like to see a mixture of online teaching and face-to-face teaching | 3.65          | 1.30|
| (3) | I have discovered new aspects of online learning for myself since WS 2020/2021 | 3.55          | 1.11|
| (4) | At my place of residence in the summer semester 2021, I have an internet connection that ensures safe participation in online courses | 4.31          | 0.94|
| (5) | In the summer semester 2021, I have access to a quiet room that I use to participate in online | 4.21          | 1.07|
| (6) | The events that will take place in the summer semester 2021 (digitally) will take place in a suitable format | 3.77          | 0.92|
| (7) | I lack adequate technical equipment (PC, printer, etc.)                   | 1.78          | 1.00|
| (8) | I have difficulties coping with the content requirements in online teaching | 2.61          | 1.16|
| (9) | I lack opportunities to exchange ideas with other students and teachers   | 3.44          | 1.27|
| (10)| I cannot do the practical exercises, experiences, laboratory work, etc. in online teaching | 2.70          | 1.41|
| (11)| I have trouble structuring my time at home                               | 3.03          | 1.35|
| (12)| I am having trouble keeping an overview (e.g. of course dates, dial-in information and assignments for preparation and follow-up) | 2.67          | 1.25|

Table 1. Variables in the LCA of digitalisation types (summer semester 2021, \( n = 955 \))
categories of “rather applies” and “fully applies” on the classification items that refer to the attitudes and assessments of online teaching as well as the individual learning conditions (items 1–6). Inversely, the response probability related to challenges (items 7–12) remains at a moderate to low level (\( p < 0.4 \)). Hence, respondents who are classified as proponents believe that teaching during the 2021 summer term was delivered in an appropriate format and that they were able to discover new aspects of online teaching (\( p > 0.8 \)). At the same time, they are more likely to have the resources needed for successful participation in online teaching. This includes, for example, a quiet workspace and a stable internet connection (\( p > 0.9 \)). Moreover, the proponents of digitalisation hardly encounter any difficulties in their learning processes. Even though the encountered lack of exchange with students and teachers produces a moderate response probability (\( p = 0.4 \)), the technical equipment, the content requirements in online teaching, time management, organisational (self-management) skills and access to practical (lab-based) courses do not pose a challenge for them, as compared to their fellow students in the other classes (\( p < 0.2 \)). In addition, members of class 1 appreciatively predict a permanent increase in the importance of online teaching (\( p = 0.9 \)) and state that they would like to maintain it as a complementary or additional educational service and mode of delivery (\( p = 0.7 \)).

Class 2, described as pragmatics of digitalisation, includes 36.3% of all students (manifest classification is 36.6%, \( n = 345 \)). Unsurprisingly, their consent with the

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**Notes:** The original variables are in German (translation by the authors). All items are based on five-point Likert-scales: “strongly disagree” (1), “disagree” (2), “undecided” (3), “agree” (4), “strongly agree” (5). Conditional response probabilities (y-axis): probabilities of category

**Source:** Authors’ data set

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**Teaching and learning**

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**Figure 2.** Estimated class conditional response probabilities in the three-class solution of extended digitisation types in 2021 (\( n = 955 \))
appropriateness of digital teaching formats ($p = 0.7$) and their assessment of whether new aspects of online learning could have been discovered ($p = 0.6$) is lower in direct comparison with class 1, although the general learning conditions are not rated significantly worse ($p > 0.8$). If challenges associated with online teaching occur, they are mainly perceived as a result of a lack of exchange between students and lecturers ($p = 0.5$), due to the restricted access to practical and lab-based courses ($p = 0.3$) or due to students’ insufficient time management ($p = 0.4$). In addition, pragmatists exhibit a more reserved attitude towards the overall growing importance of online teaching ($p = 0.7$) and a preference for a hybrid mode of face-to-face and online teaching ($p = 0.6$) in comparison to the proponents.

The students in class 3 can be characterised as sceptics of digitalisation in teaching and learning. With a share of 28.0%, they form the smallest class (manifest classification 26.9%, $n = 254$). Their conditional response probability for the scale ratings “rather applies” and “fully applies” on the items measuring the appropriateness of the introduced digital teaching and learning format as well as on the items measuring the enhancement of skills related to online learning is the lowest compared to classes 1 (proponents) and 2 (pragmatists), with a response probability value of $p < 0.3$. This can presumably be attributed to the comparatively poor learning conditions (workplace and internet connection; $p = 0.6$ for each). It is also striking that the sceptics see themselves as being confronted with the challenges of digital teaching to a much greater extent than the other classes. While the conditional response probability for the categories “rather applies” and “fully applies” with regard to problems with technical equipment is low ($p = 0.2$), it is still significantly higher than for proponents and pragmatists. Furthermore, the probability of increased challenges due to the lack of exchange with other students and lecturers is very high ($p = 0.8$). Time management, the organisation and content requirements of online courses and access to practical (lab-based) courses also cause difficulties for members of the sceptics class ($p > 0.5$). Additionally, sceptics are comparatively more likely to deny the growing importance of online teaching ($p = 0.5$) and have no desire for a future shift to a hybrid mode of face-to-face and online teaching ($p = 0.4$).

As outlined in the methods section, the second step of our analysis relates our distinction between proponents, pragmatists and sceptics with future directions of teaching and learning (see Figure 3). The three subgroups differ significantly in their preferences with regard to the future design of the teaching format (presence, online and blended learning), the promotion of social exchange (within and outside of courses) and the support for learning processes (individual and cooperative learning).

For example, proponents, pragmatists and sceptics differ significantly in their preferences for a stronger focus on presence vs. online teaching (as revealed by a Games-Howell post-hoc test). On average, proponents of digitisation (class 1) reveal the lowest preference for more face-to-face teaching ($M = 2.9$ on an ascending five-point scale) and comparatively strongly prefer an expansion of online formats instead ($M = 3.6$). The pragmatists (class 2) rather moderately advocate a return to more classroom teaching ($M = 3.5$) and less online teaching ($M = 2.9$). Finally, the majority of the sceptics (class 3) express the strongest preference for more classroom teaching ($M = 3.9$) and would rather not rely on more online teaching in the future ($M = 2.5$). Unsurprisingly, our analysis shows similar results for items that focus on the expansion of blended learning formats.

Considering the orientation towards the intensified promotion of social exchange and stronger support for learning processes, the sceptics differ significantly from the proponents and the pragmatists, although the last two groups express rather similar views on this item. Accordingly, students who are more sceptical about digitalisation are more likely to request more social exchange between students and lecturers (e.g. $M = 4.1$ for
sceptics, M = 3.6 for pragmatics and M = 3.7 for proponents). A similar picture exists for social exchange outside of courses (M = 4.0, M = 3.5 and M = 3.6) in the future. In addition, they state to a greater extent that the university should provide even more support for individual (M = 3.9, M = 3.6, M = 3.7) and cooperative learning processes (M = 3.9, M = 3.7 each).

In sum the results show that the student subgroups prefer different forms of integration in their study programmes. While parts of the students prefer more guidance and more social support, other parts seem to claim more autonomy. Thus, we assume that the diversification of teaching formats and the increasing heterogeneity of students will require further adjustments of teaching and learning towards individualisation, as well as adjustments of management procedures and quality assurance mechanisms in particular. This includes higher education didactics and academic development, evaluation of teaching and learning (e.g. by means of student ratings) and other quality assurance tools, such as accreditation.

In accordance with our theoretical assumptions and in support of the results of DiMaggio and Hargittai, aspects like the autonomy of use, skills, social support and the purpose of the use and features of the equipment matter (DiMaggio and Hargittai, 2001, p. 2). Our study reveals that the identified student subgroups – proponents, pragmatists and sceptics – inherently reflect the changed circumstances of the mandatory digitalisation in teaching and learning as expressions of digital inequalities (Schmölz et al., 2020). Similar results with different wording were found in other studies investigating larger and smaller samples of students (KüsEL et al., 2020; Händel et al., 2020; Bedenlier et al., 2021; Karapanos et al., 2021).

As mentioned above, these presumably perpetuating digital inequalities can be characterised as a technical-social mechanism and as a social reinforcement mechanism. Particularly, the technical-social mechanism underlines the importance of organisational
development and internal processes. In HEIs, most of the technical-social interactions will take place in different teaching formats with the implication that technical-social interactions will follow the preferences of the lecturer. But how can digital inequalities be addressed when we neither know lecturers’ preferences in digital learning nor students’ abilities to deal with them in advance? That is where quality assurance comes into play.

If quality assurance cares about actors, processes and outcomes, it is increasingly under pressure to provide meaningful scientific empirical evidence for HEIs within this period of coercive digitalisation. Hence, quality departments may become more relevant in translating students’ needs into the further development of academic programmes, lecturer qualification and the further development of didactical programmes in the digital age. This means a combination of three usually cross-cutting fields: quality assurance, didactics and digitalisation.

Recent research has made first steps to better understand interactions of technical preconditions, socialisation, personal preconditions, attitudes, organisational factors and many others (Schmölz et al., 2020). Undoubtedly, the practical implications with regard to quality management are manifold if we consider quality work at least partly as institutional research (Ansmann and Seyfried, 2018; Seyfried et al., 2019). But this does require that HEIs take a differentiated view on students and appreciate the diversity of different learners and lecturers’ needs. The identification of student subgroups whose members share relevant features that are empirically evidenced could be a bridge to future steps of further professionalisation strategies. Because technologies such as big data-based learning analytics are still the exception rather than the rule, the intensified collection and analysis of empirical evidence under the umbrella of quality assurance has the potential to provide meaningful and guiding knowledge.

Conclusions and recommendations
In this sense, the momentum that the COVID-19 pandemic has given to adjustments of processes within HEIs partly forces stakeholders to leave their comfort zones and take immediate action. However, the consequences of these actions are still under investigation. Accordingly, the present paper investigates students’ preferences regarding modes of delivery for teaching and learning in a medium-sized university in Germany. In our research we rely on theoretical assumptions about socialisation and the concept of the digital divide as preconditions under which students respond to changing circumstances in the digitalisation of teaching and learning (DiMaggio and Hargittai, 2001, p. 2). Based on this, we investigate students’ preferences ($n = 955$) about online teaching and learning and their expectations for future teaching and learning arrangements.

The present study aims at exemplifying a research approach that helps differentiating between different student groups and their particular responses to the impact that the pandemic had or continues to have on higher education. The question what exactly these groups imply in terms of necessary changes in the modes of delivery, academic development for teachers, measures for uplifting study skills of those in need, etc., necessarily needs to remain unanswered and is left to further research on effective teaching and learning in a (post-)pandemic era.

Our results show three distinct student subgroups, which we describe as proponents, pragmatics and sceptics. The proponents are in favour of new online tools, are supportive to their introduction, rather autonomous in organising their studies and do not necessarily need permanent personal support and interaction. Members of the opposite group are the sceptics who do not support online learning modes, are partly against their introduction, encounter problems in organising their studies and prefer more personal
support and interaction. The *pragmatics* are somewhere between these two groups. Moreover, our results reveal that these three groups are quite persistent in their answering behaviour. Beyond this, similar results were found by other researchers (see above). This underlines that the digitalisation of teaching and learning is not only a technical but also a social problem, bringing other perspectives, such as didactics or quality assurance, into play.

Compared with digitalisation and didactics, quality assurance is a cross-cutting issue. Understood as institutional research (Woodward, 2018), quality assurance may provide valid empirical evidence that helps to translate the digitalisation of teaching and learning processes in HEIs. This implies that it is necessary to understand students’ needs and preferences, on the one hand, but also to investigate the effects of online teaching formats or roles of lecturers in digital learning environments. Given the dynamics of this type of learning management, the current practice of quality assurance will not be able to keep pace and will thus be in danger of losing its meaning as a management instrument. Necessary adjustments would have to take account of the changing understanding of what quality in higher education actually is and what role quality assurance would have to play to pursue this type of quality. Practically, this would mean shifting away from the emphasis on quantitatively measurable indicators towards a more learner- and lecturer-centred approach which is diversity-sensitive and aims at reflecting on actual needs to support individual learning processes.

The empirical evidence provided by the above analyses may serve as an illustration: Knowledge on different responses to the outcomes of reforms could be used to specifically design consulting services for student subgroups in need. Thus, the future role of quality assurance would be to establish and cultivate a knowledge base to support the diversity of learners’ and lecturers’ needs instead of levelling down diversity by harmonised quality standards for the sake of external legitimation. However, increased digitalisation also could mean increased possibilities for control and scrutiny. Therefore, further research needs to show which organisational developments follow the mandatory digitalisation. It remains to be seen whether quality assurance will be able to keep the focus on qualities or whether it will expand its focus to also include quantities.

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