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# From technology to community: the role of artefacts in teaching and learning during and beyond pandemic times

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## ABSTRACT

This article explores lecturers' experience of adapting, shaping and transforming teaching and learning during the COVID-19 pandemic. The study focuses on understanding the challenges and opportunities that are afforded by pandemic-induced changes in terms of digital teaching and learning and their post-pandemic implications. Empirical data were collected through 16 semi-structured interviews with teaching staff at a Norwegian university. The article draws on Max W. Wartofsky's work on artefacts, and uses the categorisation of primary, secondary and tertiary artefacts as a theoretical lens. The data indicates that designing and delivering courses that combine online and in-site teaching is a complex process requiring flexibility and creativity, which needs to be acknowledged by management and budget-allocating entities. Career development is an incentive to invest time in developing digital teaching. Finally, building a community of peers can support course quality and the professional welfare of the teaching staff.

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Artefacts; digital teaching and learning; career development; academic practice; community building

## Introduction

Over the last few decades, universities around the world have undergone processes of digitisation, which have not only involved incorporating digital technologies in existing practices, but also reorganising and redesigning the way courses and programmes are taught, assessed and administered. During the COVID-19 pandemic, the pace of this change has accelerated, as lockdowns and other containment measures have reduced or constrained the possibilities for students and staff to meet on campus.

Research conducted on the effects of the COVID-19 pandemic on higher education reveals that students and staff have been significantly affected both by the sudden requirement to switch from campus-based education to partially or fully online education and by an 'ongoing stop-start interference of the pandemic' (Eri et al. 2021, 8). In addition, students' mental health was affected by stress, loneliness and financial difficulties caused by lockdowns (Romero-Ivanova et al. 2020; Werner et al. 2021; Volken et al. 2021).

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The COVID-19 pandemic has thrust universities into new situations that they have addressed using three types of response. The first type of response, necessary both at the beginning of the first wave of the pandemic and occasionally at its later stages, involved shutting down campuses completely, and moving all teaching and learning activities online. During the first wave of the pandemic, this was referred to as ‘emergency remote teaching’ (Leung and Chu 2020). The second type of response, which was implemented in many universities during partial lockdowns or when social distancing was either required or encouraged, involved having some teaching and learning activities on campus and others online, to reduce the risk of overcrowding. The third type of response was implemented during periods when most of the restrictions had been lifted, but when quarantine rules reduced the availability of campuses. In such cases, some of the academic content was made available digitally in combination with teaching and learning activities on campus.

This state of uncertainty, brought about by a sense of potential but not always imminent crisis, raises questions regarding the readiness of teaching staff to adapt to external changes, and regarding what support they might need to change their teaching practices, both during pandemic times and beyond.

## Literature review and theoretical framework

The literature on digital teaching and learning in higher education spans several decades, and broadly distinguishes between three formats for teaching and learning. The first format, which is rooted in a long university tradition, is referred to as ‘face-to-face’ (F2F) teaching and learning, i.e. teaching and learning activities performed in synchronous time and space, typically on campus. This format may involve the use of digital technologies (as suggested in Bernard et al. 2014), but used as a supplement to, and not a replacement for, face-to-face interaction. The second format, referred to as ‘blended learning’ or ‘hybrid learning’, involves a combination of face-to-face and online teaching and learning activities (Bernard et al. 2014). The third format, ‘online teaching/online learning’, generally refers to teaching and learning activities that take place online without any face-to-face interaction. The promises of online and hybrid education include adaptive or personalised learning (Ferguson and Aitken 2019; Arnesen et al. 2019) and catering to the needs of a diverse student body (Kotera et al. 2019; Pearson et al. 2019), mitigating the barriers that, e.g. displaced persons and refugees face regarding access to higher education (Reinprecht et al. 2021). It should be noted that the delimitations between ‘face-to-face’, ‘online’ and ‘hybrid’/‘blended learning’ may be blurry. In particular, ‘online’ teaching is not always equivalent to ‘remote’ teaching, as online teaching also can happen on campus.

Challenges regarding blended learning and online learning include assessment (Gaytan and McEwen 2007; Gikandi, Morrow, and Davis 2011) and student engagement (Dixson 2010; Dumford and Miller 2018). Issues of inequality in terms of access to digital education have also been discussed, both regarding access to physical infrastructure (Devkota 2021; Qashou 2022) and regarding digital literacy (Laufer et al. 2021). An additional challenge, highlighted in Collins, Glover, and Myers (2022), is that the ‘emotional labour’ undertaken by teaching staff in online or blended environments, is often unreported and therefore invisible. A more general concern in higher education

is the increased focus by institutions on research and income generation, leaving little room for transformative teaching initiatives (McCune 2021). The relative opaqueness regarding what is expected of an academic in terms of teaching, research and service, may exacerbate the difficulty of prioritising tasks, as suggested in Sutherland (2017) and Nästesjö (2021). Boyer-Davis (2020) also suggests that staff who are required to digitalise their teaching and upgrade their technological skills at short notice can experience ‘technostress’ due to ‘altered work patterns, higher performance demands, role ambiguities and subsequent role overload’ (page 44). More generally, the sudden move from campus-based to online teaching has revealed that teaching staff lacked online-learning-related pedagogical content knowledge, which includes ‘the pedagogical foundations and knowledge of principles needed to design for, and facilitate, meaningful online learning experiences’ (Rapanta et al. 2020, page 923).

One example of pedagogies that have received much attention in the literature, often referred to as ‘flipped learning’ or ‘the flipped classroom model’, relies on the increased availability of digital content, and the expectation that this availability would allow students to acquire fundamental knowledge outside the classroom, thereby freeing up time during classes to engage in active learning. This pedagogy has been presented as innovative (Fuchs 2021), but also as disruptive (Hutchings and Quinney 2015; Yusuf and Taiye 2021), and even as representing a ‘transgression over the enacted socially constructed discourse defining what it means to *do* teaching’ (Wilson 2020, page 10). This pedagogy is not new and follows a long tradition of learner-centered pedagogies whereby students familiarise themselves with learning material before attending classes or tutorials (as suggested in e.g. Mason and Gayton 2022).

Digital teaching and learning can co-exist on campus, online, or in hybrid form. On the surface, technology may appear to be the main enabler of digitally mediated teaching and learning. However, much of the literature on digitally supported teaching and learning indicates that technological tools remain underused or are primarily used for administrative purposes when their capacity to support pedagogical practices is unclear or under-communicated (Vandeyar 2021). Goodchild and Speed (2019) suggest that the very term ‘technology enhanced learning’ could be misleading as it may reinforce a rhetoric whereby technology is presented as the main factor in the enhancement of learning. Technology has also been presented as reshaping the role of the teacher into that of a learning designer (Laurillard et al. 2018). This new role has consequences on time management and, ultimately, on the cost of running courses that have a technology component (as pinpointed by, e.g. Kennedy et al. 2015).

It is also important to acknowledge the existence of a wide range of non-technological artefacts used in designing, shaping, and performing learning and teaching situations, alongside technological artefacts. For example, artefacts such as books, articles, models, and theories are also present and important in distance and hybrid teaching and learning. Berry (2016) argues for treating ‘the rich exchanges that occur within an online class’ (page 2) as artefacts to be retained and reused with subsequent student groups, as ‘physical relics in the form of student artefacts left behind at the end of an online course’ (page 2). The notion of ‘postdigital education’ is becoming increasingly central to understanding future challenges in education, highlighting the need for a holistic approach to education that moves ‘beyond edu-techno-problems and edu-techno-fixes [...] and to address human problems in their entirety’ (Jandrić 2020, page 176).

Artefacts, both digital and analogue, are embedded in ‘postdigital ecologies’ where artefacts, students and staff interact when developing and establishing cultures and practices (Aitken 2021; Fawns 2019).

Sociocultural and socio-constructivist theories offer a relevant perspective on the issue of how artefacts relate to teaching and learning. Artefacts or tools are created and used in a historical, social and cultural contexts that both shape and are shaped by those tools (Cole 1996, 1998; Vygotsky 1978, 1986, 1987; Wertsch 1991). The concept of artefact is also relevant to the concept of communities of practice (Lave 1996; Lave and Wenger 1991). Wenger (1998) suggests that such communities need practices that embody a common purpose and solidify it through a ‘wide range of processes that include making, designing, representing, naming, encoding and describing, as well as perceiving, interpreting, using, reusing, decoding and recasting’ (page 59) which he refers to as ‘reification’. The notion of artefact is also related to that of ‘boundary objects,’ which refers to objects that can be seen and interpreted by different actors with divergent viewpoints while retaining their own identity (Star and Griesemer 1989). Drawing the notion of artefact to the issue of how technology and learning interact, Säljö (2010) proposes a conceptualisation of technologies as ‘partners in learning and knowing’ (page 61), whereby human knowledge ‘is expressed in our abilities to merge and collaborate with external tools and to integrate them into the flow of our doings’ (page 62). As suggested in Arstorp (2021), a dialectical thinking of how human tools interact with their socio-cultural context forms one of the tenets of socio-cultural perspectives on learning (Vygotsky 1978) and Wartofsky’s theory of artefacts (1979).

Wartofsky (1979) proposes categorising artefacts as either primary, secondary, or tertiary. The term *primary artefact* designates an object that is used directly in production. Examples given by Wartofsky (1979) are axes, clubs, needles and bowls. Other examples of primary artefacts could be a pen, a fridge, a lawnmower, or a mobile phone. The term *secondary artefact* designates artefacts that are representations of primary artefacts. These secondary artefacts are created and used ‘in the preservation and transmission of the acquired skills or modes of action or praxis by which this production is carried out’ (page 202). The concept of secondary artefacts therefore refers to artefacts that embody the practices, routines and procedures developed around the use of primary artefacts. For instance, a speed bump in a residential street can be a primary artefact, while a secondary artefact could be a graphical representation of the speed bump, for example in a traffic sign. Another example, described in Habib and Wittek (2007), could be a portfolio-based assessment of a university course, where the primary artefact is the physical portfolio that the students create, whereas the discussions they have around the creation of the portfolio may be considered a secondary artefact.

According to Wartofsky (1979), *tertiary artefacts* emerge when ‘the forms of representation themselves come to constitute a “world” (or “worlds”) of imaginative practice’ (page 207). These ‘imaginary’ artefacts are no longer directly related to primary artefacts. They are ‘a class of artifacts which can come to constitute a relatively autonomous “world,” in which the rules, conventions, and outcomes no longer appear directly practical, or which, indeed, seem to constitute an arena of nonpractical, or “free” play or game activity’ (page 209). Wartofsky goes on to explain that ‘[s]uch imaginary worlds I do not take as “dreams” or “in the head”, but as embodied representations, or better, embodied alternative canons of representation: embodied in actual artifacts, which express or

picture this alternative perceptual mode. Once the visual picture can be “lived in”, perceptually, it can also come to color and change our perception of the “actual” world, as envisioning possibilities in it not presently recognized’ (page 209). These tertiary artefacts can be conceived of as ‘a representation of possibilities which go beyond present actualities’ (page 209).

In the example of the speed bump as a primary artefact, where the secondary artefact is a traffic sign representing the bump, one might expect that a tertiary artefact could be a more careful driving behaviour in general in the area surrounding the speed bumps. In the example of the portfolio-based assessment of a university course, a tertiary artefact could be the development of ‘portfolio thinking’, i.e. a way of thinking where students ‘have integrated the concept of self-documentation into their daily lives to the point where it will be natural for them to gather text and documents, use them to communicate with others, and update them according to the feedback given’ (Habib and Wittek 2007, page 279). In those two examples, the tertiary artefacts are not directly linked to the primary artefacts, but the existence of the primary artefacts allows for the development of secondary and, consequently, tertiary artefacts.

We found that the concepts of primary, secondary and tertiary artefacts to be an interesting lens for our analysis of the interview data focusing on the day-to-day performance of teaching and learning in higher education.

## Research methodology and design

This study focuses on one institution of higher education, a profession-oriented university in Norway, that uses a wide range of pedagogical methods, including traditional lectures, individual and group supervision, laboratory work, project-based learning, and internships. Given the multifacetedness of pedagogical practices across the institution, we chose a qualitative methodological approach within the realm of an interpretative framework. Our goal was to collect rich data that allowed for a multiplicity of perspectives on reality, in line with an interpretive research philosophy, which ‘assumes that reality is socially constructed; that is, there is no single, observable reality. Rather, there are multiple realities, or interpretations, of a single event’ (Merriam and Tisdell 2016, page 9). We used semi-structured in-depth interviews as a data collection method to elicit data that would bring to light a diversity and plurality of perspectives.

The empirical data consisted of 16 interviews with teaching staff at the university, all conducted over 30 days during the spring semester of 2021. Interviewees were recruited among the academic staff from the various faculties at the institution, and from a variety of academic backgrounds. The main inclusion requirement for the recruitment of interviewees was having taught at least one semester at the university during the pandemic and planning to continue teaching in the foreseeable future. The interviews lasted between sixty and ninety minutes each. The interviewers wrote down the main points while conducting the interviews and immediately afterwards, as well as non-verbal cues such as tone, speed of speech, laughs, mimics etc. The study has been approved by the Norwegian Centre for Research Data (NSD). The NSD approval includes the approval of a project outline including a plan for recruitment of informants, anonymizing of personal data and obtaining informed consent from informants (the reference number for the project at NSD is 415821).

The main aim of the interviews was to obtain rich insights into the everyday teaching and supervision practices of academic staff across all faculties of the university in the changing landscape of the COVID-19 pandemic. We aimed to gain an understanding of the motivations, inspirations and concerns of academic staff with regard to their teaching and their students' learning. We informed the interviewees that we were interested in their subjective understanding of their own pedagogical practice, both in so-called 'normal' teaching situations and during the pandemic. We also indicated that we were interested in what academics felt that they needed from the university to achieve their pedagogical and didactical goals, both during pandemic times and beyond.

The interviews were based on a set list of core questions from an interview guide that both interviewers followed. The amount of time spent on each topic depended on the interviewees' level of interest and experience of the topic. Follow-up questions were also asked whenever clarification was needed. The combination of structure and flexibility afforded by semi-structured interviews allowed us to touch on all the main themes in all interviews, while delving deeper into certain topics. The interviewees' personal reflections provided a vivid and powerful texture to their testimonies, which contributed to a rich and complex data set.

The focus of the interviews was not on artefacts, but on pedagogical practices. The reason for this choice of focus was that we wanted to elicit reflections around the whole experience of university teaching in the interviewees' own words. The three authors conducted a thematic analysis of the raw data, which involved first eliciting the main themes emerging from each interview, then identifying common themes across some or all the interviews – or 'patterns' as suggested in Hammersley and Atkinson (2019). In the process of identifying patterns and umbrella themes, it became clear that technological and non-technological artefacts played a major and pervasive role in the pedagogical practice described by the interviewees. For each umbrella theme, we discussed and agreed upon where, if relevant, the theme would belong in the Wartofskian categorisation of primary, secondary and tertiary artefacts. In doing so, we experienced the complexity of the theme-generating process, as described by e.g. Ayre and McCaffery (2022) and Nowell et al. (2017).

## Findings

In this section, we will present data obtained from the interviews, with a special focus on identifying artefacts. These artefacts are categorised according to the Wartofskian distinction between primary, secondary and tertiary artefacts.

### *Primary artefacts*

In their description of their teaching practice in and outside the classroom, interviewees described several artefacts that can be considered primary artefacts in that they are directly used to perform the teaching and learning activities. Some of these artefacts rely heavily on digital technology, while others take different forms.

The interviewees mentioned using several types of highly digitally mediated primary artefacts, ranging from generic tools used across the whole university to more specific artefacts they either selected or created themselves. The generic tools that the

interviewees reported using included the university's virtual learning environment and tools that teaching staff could elect to use but were not compulsory. The interviewees highlighted some tools as particularly useful, including 'learning path' functions, poll functions, and virtual bulletin boards.

Some interviewees reported that going through large volumes of material from the internet to assess its relevance and academic quality was a time-consuming and frustrating process and had created their own videos presenting parts of the academic course content. Others had created digital books covering parts of the curriculum for their course. Some interviewees mentioned using primary artefacts that were available digitally, but that could exist outside the digital sphere, for example written cases provided as a basis for student assignments or published articles on a topic relevant to the curriculum.

### ***Secondary artefacts***

When describing how they planned and designed the teaching and learning activities in and outside the classroom, the interviewees mentioned using pedagogical methods that often involve the creation and use of artefacts that can be considered to be secondary artefacts. In some cases, the interviewees created these secondary artefacts as support for their own teaching. For example, one of the interviewees had drafted a 'self-help guide for Zoom sessions' for classes to be carried out on the videoconferencing platform, to ensure that they were as prepared as possible for every eventuality during the sessions.

Other instances of secondary artefacts can be found in activities that interviewees described giving to the students before class. For example, some of the interviewees assigned out-of-class activities where students posted their reflections on a virtual bulletin board before the class started. Some interviewees had developed digital material that was either designed to support learning outside classes or that was primarily designed for in-class use but that students also used outside class time.

In other cases, interviewees reported creating learning activities to be performed during the class with or without digital tools. For example, some interviewees used written cases or cases presented in a video format to trigger reflection and discussion in a classroom setting. One of the interviewees had created a 'mock scientific journal for students', where first-year students were asked to 'submit' articles in the IMRAD format, and where articles were subsequently peer-reviewed by their co-students. Other interviewees used role-playing exercises in class to prepare students for interactions that could realistically occur in the exercise of their future professions.

Several interviewees mentioned that they had designed classroom or online activities whereby students created artefacts as part of their learning process, or where the artefact was co-created by students and teaching staff. For example, one of the interviewees had created a board game where the students created the questions to be answered in the game, before playing the game. Another interviewee included the design of an academic poster as a learning activity in their course. The tools used in the creation of the poster might consist of pen and paper, or drawing software, as well as course material or sources from the literature. The poster itself was meant to embody the students' knowledge of a topic, and to provide a link to the professional field that the study programme prepares the students for.



I want to make the teaching practice-oriented, to remind the students of ‘why you need to know this’. It can be difficult for the students to understand it on their own. [...] The poster presentations are meant to help the students feel that they are part of a profession. To help them feel the responsibility [that comes with] being part of a profession. (interviewee no. 14)

Other interviewees used artefacts that were more ‘abstract’, or less ‘palpable’ than a poster or a board game. For example, some of the interviewees used role-playing exercises where students trained on interactions that could realistically occur in the exercise of their future profession. One interviewee had designed an ‘escape room’ exercise for nursing students where they worked in groups to solve a realistic clinical problem. The rationale for creating this exercise was to counteract some of the negative effects of the pandemic lockdowns. The pandemic had forced institutions to reduce the length of students’ practice periods, which meant that they had less opportunity to acquire practical knowledge and skills. In addition, the pandemic had reduced the amount and quality of interaction between students and academic advisors during their internship, as academic advisors were not allowed to visit students on site during the strictest phases of the lockdown. The ‘escape room’ exercise allowed the students to practice situational awareness and teamwork, in a time-limited context where the students’ focus and participation was key to achieving a satisfactory result.

A common element in the learning activities described by the interviewees is that they were made of an assortment of practices, discourses, ideas and materials, that lecturers combined in order to support the students’ learning. The learning activities were also all embodied activities, where the aim was that the students’ subjective experience of performing the activity would scaffold their process of gaining a new, deeper or broader understanding of their academic field and of their future profession. Those learning activities appeared to be secondary artefacts, as they embodied practices that make use of primary artefacts with the aim of developing the students’ learning.

It is also interesting to point out that the board game, the academic poster and the ‘escape room’ are examples of artefacts that can be seen simultaneously as primary and secondary, depending on the context. One may argue that the very potential of an artefact to cross the line between primary and secondary can be an indication of its capacity to support learning.

### ***Tertiary artefacts***

Data from the interviews indicate that some of the artefacts created and shaped in the interviewee’s educational settings are tertiary artefacts.

### ***Student learning and attitude***

During the interviews, the development of the students’ modes of learning and attitudes towards learning appeared to be central to the choices the interviewees made. The students’ attitudes towards learning may be considered a tertiary artefact, which, while it is based on secondary artefacts such as learning methods and learning activities, can also be said to transcend them.

One of the interviewees described their approach to supporting student learning through reflection and imagination. They presented an array of learning methods to

the students, including creating songs and rhymes, drawing and illustrations, and taking notes, in order to help the students assess what works best for them. While the various methods (songs, rhymes, drawing, etc.) are secondary artefacts, the very act of reflecting on which methods are most beneficial to learning in different circumstances goes beyond the learning activities themselves. Such reflection can open up imaginative possibilities for further learning, and can be conceived as a tertiary artefact, transcending the activities performed in the classroom with secondary artefacts.

Another example of student learning as a tertiary artefact can be found in the use of poster activities. As mentioned above, posters may be seen as secondary artefacts. However, the activity of creating a poster, and related activities such as reading and providing feedback on other students' posters, is meant to equip students with a deeper understanding of their academic field and a keener awareness of how knowledge from their field can be conveyed in visual form. This accrued understanding of the field and increased awareness of how knowledge can be communicated may be considered tertiary artefacts.

One interviewee described the advantages of using digital learning tools as follows:

[We can transfer] the boring knowledge into a digital learning tool, for the students to go through before they meet in physical class. [This allows me to] work with the advanced topics when we meet and reflect and achieve good outcomes together. [...] In order to achieve this, the students must first have acquired a certain amount of knowledge. [...] When I later see that the students return to the digital learning tool, I am happy. (interviewee no 13)

In this instance, the interviewee appeared to clearly distinguish between what they referred to as 'boring knowledge' and what they considered 'more advanced topics.' From a Wartofskian point of view, the learning material could be considered a primary artefact, and the classification of the material as either basic ('boring') or more advanced as a secondary artefact. The process described by the interviewee whereby the students themselves took the initiative to go back to the digital learning tool to acquire more basic knowledge when they identified a gap in their own learning could be considered a tertiary artefact.

Some interviewees described having been concerned that digitalising teaching and learning would increase the distance between teaching staff and students, but experienced the opposite, as digital tools allowed them to follow their students more closely. This in turn affected their intrinsic motivation to explore the capabilities of digital tools and reduced their fear of experimenting with new pedagogical methods. This increased motivation to experiment with technology may be considered a tertiary artefact.

### *Pedagogical trajectories*

Data from the interviews suggests that teaching staff found that the introduction of new pedagogical practices, in particular the 'flipped classroom pedagogy', created new expectation in terms of flexibility and preparedness.

The challenge of a flipped classroom is that the educator has a completely different role. I am tired after the seminars. I never know which topic will pop up and in which direction it [the discussion] will go. I have to be alert and prepared all the time. But I am very elated

afterwards, when the students use knowledge from the preparations or the digital material. (interviewee no. 14)

Some interviewees reported feeling a heightened sense of vulnerability when introducing the flipped classroom method. They clearly distinguished between student-active learning methods and more traditional teaching methods such as lectures. One of the interviewees expressed this feeling as follows:

It has been scary to start using the flipped classroom [pedagogy]. [I have] low self-confidence. [...] The lecturer has to be willing to remain in [a position of] insecurity, as they can no longer hide behind a medium. (interviewee no. 8)

Another interviewee offered their interpretation of how the traditional lecture format gave them a sense of control over the learning situation.

In a lecture situation, we [the teaching staff] have all the power. We can decide who speaks and who doesn't. I can decide to cover the topics I know most about and define what the students should be learning. (interviewee no. 3)

Some of the interviewees described the transformational processes they had undergone when adopting student-active learning methods.

The more I perform [student-active learning activities], the safer I feel. I was very nervous the first time, but I have experienced that the better this works, the more I believe in myself and the [pedagogical] approaches [that I use]. (interviewee no. 13)

One of the interviewees commented on the specific needs of teaching staff at the beginning of their career.

Younger educators need more security, self-reflection, and courage. [They need to] dare to see themselves from the outside. (interviewee no. 3)

The general feeling amongst interviewees was that the introduction of student-active learning challenged their role as educators and forced them to adapt to a new pedagogical reality where they had less control over what happened in the classroom than in traditional lecture situations. The descriptions of their own transformative trajectories, which required them to embrace new insecurities, indicated that they had acquired a new set of skills that allowed them to be comfortable with uncertainty and ambiguity. This set of skills can be conceived of as a tertiary artefact.

### *Time resources, career building and community*

Time is one of the recurring themes throughout the interviews. All the interviewees were keen to spend as much time as possible with the students and were willing to spend time creating digital content. However, this wish did not always align with the set method of calculating the time to be allocated to a course. The issue of time allocation is closely related to the issue of management, as pointed out by two of the interviewees.

Management has a central role. It is of utter importance that academic managers focus of learning. They own the teaching staff's time and they should be clear about what is expected of them. (interviewee no. 15)

Some interviewees mentioned the need to find synergies between teaching and research, both for the sake of educational quality, and for career development. One interviewee

mentioned being introduced to pedagogical development issues early in their teaching career and described how being part of a pedagogical research project has sparked an interest in improving their teaching throughout their academic career.

Another interviewee highlighted the value of doing research and publishing papers with career development in mind.

It is important to integrate research in this project, to do research on [one's] own teaching and write articles. It is an important incentive for participating in competence development initiatives. It should also be part of formal career development. (interviewee no. 4)

Some interviewees expressed a need for a pedagogical community for inspiration and discussions around innovative teaching and learning. This type of community can be considered to be a tertiary artefact, which transcends both the tools (primary artefacts), and the patterns of use (secondary artefacts). From the interviews, it appears that the need for a community encompasses both a need for knowledge sharing and a need for support. Interviewees wanted feedback from peers on the planned pedagogical activities, as well as inspiration to expand their repertoire of classroom-based and online activities, based on the experience of others.

[I need support] either from someone who is more experienced [than me] or that is doing something similar [to me]. Or that we mentor each other in a peer-guidance team. Cheering each other on. If we meet opposition, there would be several of us working together [against it]. (interviewee no. 13)

I need more theory and experience of how to lead a class. I am comfortable talking in front of people but I need more input as to what is most effective in a teaching situation. (interviewee no. 12)

Another respondent expressed a certain amount of reluctance towards collegial feedback.

If it is not done right, it could be really dangerous. It could lead to [teaching staff] breaking each other down. It requires proper training to ensure that it doesn't happen. (interviewee no. 3)

It is apparent from the interviews that the combination of student-active learning methods and the use of digital platforms has consequences not only for the individual educators' pedagogical practice, but also for management practices and the organisation of the university. This new development challenges the established procedures for allocating time resources according to a standardised set of rules. The changing pedagogical practices require line managers to acquire a deeper understanding of the realities of digital teaching and learning. In addition, there appears to be a need for greater awareness across the organisation of the value of a community of practice for teaching staff.

## Discussion

The data presented in the above section indicate that the pedagogical practice of lecturers who introduce digital student-active learning activities in their courses is tightly intertwined with a range of artefacts that can be thought of as primary, secondary and tertiary. In this section, we propose to discuss the relationship between various types of artefacts and wider issues such as the career development of teaching staff and the need to foster a sense of community through peer learning.

### ***A complex relationship between artefacts and expectations***

The data from the interviews indicate that lecturers navigate a complex landscape of multiple, and sometimes conflicting, expectations from several sources, including students, managers, colleagues, and the professional field that the academic programme aims to prepare the students for. The introduction of new pedagogical practices may change these expectations and exacerbate the tensions between them.

Data from the interview indicates that the uncertainties brought about by the pandemic have had profound consequences for how educators relate to the design of their courses. Instead of designing a course either as face-to-face, or online, or hybrid, educators feel compelled to design courses in a way that allows for up to several quick changes during the course. The resulting 'product' may feel suboptimal both for the lecturers who design the learning and for their students, as the quality level of the various alternatives may be lower than normal due to the overarching need for the course to be flexible. In their descriptions of their lived experience of flexible teaching practices, respondents also describe heightened degrees of exhaustion and anxiety that reveal an increased amount of 'emotional labour', which is difficult to quantify and therefore to recognise and to compensate adequately. In light of the changing landscape of higher education and heightened expectations from students, there appears to be a need for teaching staff to develop new skills that would allow them to embrace uncertainty and to adapt their teaching to a wider spectrum of student expectations in the design of their courses.

### ***Reconceptualizing time allocation***

One challenge seems to be that the very existence of a variety of digital tools across the university leads students to expect that all the teaching staff will use all the available tools and master them equally well. The data suggests that every digital tool is a primary artefact, which, in order to be used effectively, requires the lecturer to be familiar with it, have learned about its areas of use and limitations, appropriated it and adapted it to their own teaching. This is generally done through the development of secondary artefacts that take time to design and test. The interview data also indicates that teaching staff who introduce digital student-active methods in their teaching tend to develop secondary artefacts in connection with their teaching practice. The development of such secondary artefacts requires imagination, inspiration and an ability to handle the uncertainty that arises from teaching and learning situations that are unscripted and unpredictable. The knowledge and skills set that combine an understanding of digital tools and an ability to react quickly to unanticipated situations emerging from student-active methods, can be seen as a tertiary artefact. This tertiary artefact can be leveraged by the lecturers to develop their own career in academia. It can also be leveraged and supported by managers and decision-makers to develop the organisation as a whole.

The findings of this study echo earlier research on time allocation from e.g. Laurillard et al. (2018) and Kennedy et al. (2015). As time appears to be a central resource for the successful implementation of digital tools at the university, there might be a need for a reconceptualization of how the time of teaching staff is to be spent. Whereas traditional

teaching methods allowed for teaching staff to spend relatively more time in face-to-face teaching activities, the digitalisation of teaching and learning forces a restructuring of time allocation, with more time used in designing, editing and curating digital material, and relatively less time spent on face-to-face activities. There is also a need for an acceptance of this new way of spending time by all the stakeholders in the university, including the teaching staff themselves, managers and students. This new conceptualisation of time usage goes beyond the realm of administrative processes of time allocation and has deep implications on how staff and students view the role of educators in higher education.

### ***Integrating community and career development***

It is interesting to note that while the respondents almost unanimously mention a wish for a community of practice to get support and inspiration, there is no indication that this has been tried in the organisation. The data from the interviews suggest that implementing a collegial feedback process without quality assurance of the feedback could have negative consequences at the individual and organisational level. At the individual level, a faculty member might feel unfairly criticised and lose the motivation for innovative teaching. At the inter-personal level, the quality of the relationship between two colleagues might be compromised if the recipient of the feedback feels misunderstood. This can have organisational consequences as faculty members may be reluctant to join collegial feedback initiatives either for fear of receiving or giving unfair feedback. The practical implementation of a community of peers may therefore require new skills for the teaching staff, including the ability to provide constructive feedback on the teaching practices of others. This may in turn require communication skills training and the development of a shared vocabulary to communicate effectively about teaching across academic fields.

### ***Reflections on the wartofskian classification of artefacts***

Identifying primary, secondary and tertiary artefacts is not a straightforward task, mostly because the qualities that characterise each type of artefacts are not inherent to the artefacts but emergent from the networks of people and artefacts in which they are embedded. Our experience is that the notion of tertiary artefacts is relatively difficult to apply in the context of higher education. One of the reasons for this difficulty might be that while what we identify as primary artefacts are mostly concrete and tangible artefacts, and secondary artefacts generally encompass activities and methods that are directly related to concrete and tangible artefacts, tertiary artefacts are harder to pinpoint as they relate to modes of doing and modes of thinking, which are, by definition, more abstract and immaterial. Getting a full understanding of tertiary artefacts related to teaching in higher education can be a challenging task due to the relative lack of status for teaching compared to research in career development in academia and in evaluative practices of academic work (as suggested in, e.g. Sutherland 2017 and Nättesjö 2021). However, acknowledging the existence of this very challenge may be constructive in itself, as it may epitomise a lack of recognition of the learning and transformative process that academics go through as they develop as educators.

## Conclusions and future research

The empirical data in this study indicates that teaching staff are faced with intensified expectations from students and management in terms of flexibility, which has consequences for resource use and for the required skills set to fulfil the whole spectrum of demands put on a teaching role at university level. In particular, the data points to the existence of structural challenges in the way teaching time is perceived, allocated and valued in higher education. One of the main issues emerging from this study appears to be a gap between the formal allocation of teaching time, which follows standardised rules with little room for flexibility, and the actual amount of time needed to prepare for and perform teaching tasks. This gap widens during times of crisis, as teaching staff experience that the requirement to cater for all eventualities in terms of online, on-site, or hybrid teaching demands substantially more time than the standard time allocated to them. The possibility of abrupt changes in terms of room availability on campus during periods of total or partial social distancing requires teaching staff to develop creative problem-solving skills in order to ensure that their students get the teaching they need. The findings from this study indicate a need to reframe the status of teaching staff in higher education in a way that acknowledges the complex nature of teaching and supervision activities in an ever-changing digital landscape. In that context, management's use of standardised time-allocation systems appears to be outdated and counter-productive. The study also identifies a general need for a community of teaching staff, which can provide them with the visibility, support and acknowledgement they need to feel safe in their choice and implementation of innovative pedagogical methods. These findings tie in with related work in the socio-material literature, especially the concepts of 'reification' that solidify communities of practice (Wenger 1998) and the notion of 'boundary objects' that can adapt to different perspectives while preserving their distinct identity (Star and Griesemer 1989).

A limitation of the study is that it was conducted in a single university with a relatively homogeneous group of respondents. Further research is needed to obtain insights from a wider spectrum of stakeholders, including students, managers and administrators. The issue of community can also be researched further, for example using methods such as observation and focus-group interviews, or action research approaches involving a researcher being immersed in the field over time, which could provide new insights about the how such communities can be built, developed and maintained in an inclusive and supportive manner.

## Author contributions

Conceptualisation: Anita Reitan, Margrethe Waage, Laurence Habib; Data curation: Anita Reitan, Margrethe Waage; Formal analysis: Anita Reitan, Margrethe Waage, Laurence Habib; Writing – original draft: Anita Reitan, Margrethe Waage, Laurence Habib; Writing – review & editing: Anita Reitan, Margrethe Waage, Laurence Habib.

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## References

- Aitken, Gillian A. 2021. "Postdigital Exploration of Online Postgraduate Learning in Healthcare Professionals: A Horizontal Conception." *Postdigital Science Education* 3: 181–197. doi:10.1007/s42438-020-00103-w.
- Arnesen, Karen T., Charles R. Graham, Cecil R. Short, and Douglas Archibald. 2019. "Experiences with Personalized Learning in a Blended Teaching Course for Preservice Teachers." *Journal of Online Learning Research* 5 (3): 251–274.
- Arstorp, Ann-Thérèse. 2021. "25+ Years of ICT in Policy Documents for Teacher Education in Norway and Denmark (1992 to 2020): A Study of how Digital Technology is Integrated Into Policy Documents." *Education Inquiry* 12 (4): 365–389. doi:10.1080/20004508.2021.1972594.
- Ayre, Julie, and Kirsten J. McCaffery. 2022. "Research Note: Thematic Analysis in Qualitative Research." *Journal of Physiotherapy* 68 (1): 76–79. doi:10.1016/j.jphys.2021.11.002.
- Bernard, Robert M., Eugene Borokhovski, Richard F. Schmid, Rana M. Tamim, and Philip C. Abrami. 2014. "A Meta-Analysis of Blended Learning and Technology use in Higher Education: From the General to the Applied." *Journal of Computing in Higher Education* 26 (1): 87–122. doi:10.1007/s12528-013-9077-3.
- Berry, Stuart C. 2016. "Persistent Artefacts in an Online Classroom: The Value of a Dynamic Learning Archive." *Canadian Journal of Learning and Technology* 42: 2. doi:10.21432/T2MK8G.
- Boyer-Davis, Stacy. 2020. "Technostress in Higher Education: An Examination of Faculty Perceptions Before and During the Covid-19 Pandemic." *Journal of Business and Accounting* 13 (1): 42–58.
- Cole, Michael. 1996. *Cultural Psychology: A Once and Future Discipline*. Cambridge, MA: Harvard University Press.
- Cole, Michael. 1998. "Can Cultural Psychology Help Us Think About Diversity?" *Mind, Culture, and Activity* 5 (4): 291–304. doi:10.1207/s15327884mca0504\_4.
- Collins, Hilary J., Hayley Glover, and Fran Myers. 2022. "Behind the Digital Curtain: A Study of Academic Identities, Liminalities and Labour Market Adaptations for the 'Uber-Isation' of HE." *Teaching in Higher Education* 27 (2): 201–216. doi:10.1080/13562517.2019.1706163.
- Devkota, Kamal Raj. 2021. "Inequalities Reinforced Through Online and Distance Education in the age of COVID-19: The Case of Higher Education in Nepal." *International Review of Education / Internationale Zeitschrift Für Erziehungswissenschaft* 67 (1/2): 145–165. doi:10.1007/s11159-021-09886-x.
- Dixon, Marcia D. 2010. "Creating Effective Student Engagement in Online Courses: What do Students Find Engaging?" *Journal of the Scholarship of Teaching & Learning* 10 (2): 1–13.
- Dumford, Amber D., and Angie L. Miller. 2018. "Online Learning in Higher Education: Exploring Advantages and Disadvantages for Engagement." *Journal of Computing in Higher Education* 30 (3): 452–465. doi:10.1007/s12528-018-9179-z.



- Eri, Rajaraman, Prasad Gudimetla, Shaun Star, Josh Rowlands, and Anit Girgla. 2021. "Digital Resilience in Higher Education in Response to COVID-19 Pandemic: Student Perceptions from Asia and Australia." *Journal of University Teaching & Learning Practice* 18 (5): 7–26. doi:10.53761/1.18.5.7.
- Fawns, Tim. 2019. "Postdigital Education in Design and Practice." *Postdigital Science and Education* 1 (1): 132–145. doi:10.1007/s42438-018-0021-8.
- Ferguson, Karen, and Renee Aitken. 2019. "A Large Scale Project to Develop Personalized Learning Pathways at a University." *Online Journal of Distance Learning Administration* 22 (2): 1–7.
- Fuchs, Kevin. 2021. "Innovative Teaching: A Qualitative Review of Flipped Classrooms." *International Journal of Learning, Teaching and Educational Research* 20 (3): 18–32. doi:10.26803/ijlter.20.3.2
- Gaytan, Jorge, and Beryl C. McEwen. 2007. "Effective Online Instructional and Assessment Strategies." *American Journal of Distance Education* 21 (3): 117–132. doi:10.1080/08923640701341653.
- Gikandi, J. W., D. Morrow, and N. E. Davis. 2011. "Online Formative Assessment in Higher Education: A Review of the Literature." *Computers & Education* 57 (4): 2333–2351. doi:10.1016/j.compedu.2011.06.004.
- Goodchild, Tim, and Ewen Speed. 2019. "Technology Enhanced Learning as Transformative Innovation: A Note on the Enduring Myth of TEL." *Teaching in Higher Education* 24 (8): 948–963. doi:10.1080/13562517.2018.1518900.
- Habib, Laurence, and Line Wittek. 2007. "The Portfolio as Artifact and Actor." *Mind, Culture, and Activity* 14 (4): 266–282. doi:10.1080/10749030701623763.
- Hammersley, Martyn, and Paul Atkinson. 2019. *Ethnography: Principles in Practice*. Milton: Taylor and Francis Group.
- Hutchings, Maggie, and Anne Quinney. 2015. "The Flipped Classroom, Disruptive Pedagogies, Enabling Technologies and Wicked Problems: Responding to 'the Bomb in the Basement'." *The Electronic Journal of e-Learning* 13 (2): 105–118.
- Jandrić, Petar. 2020. "The Postdigital Challenge of Pandemic Education." *Journal of Contemporary Educational Studies / Sodobna Pedagogika* 71 (4): 176–189.
- Kennedy, Eileen, Diana Laurillard, Bernard Horan, and Patricia Charlton. 2015. "Making Meaningful Decisions About Time, Workload and Pedagogy in the Digital Age: The Course Resource Appraisal Model." *Distance Education* 36 (2): 177–195. doi:10.1080/01587919.2015.1055920.
- Kotera, Yasuhiro, Pauline Green, Lucy Hutchinson, Paula Shaw, Nicholas Bowskill, and Vicky Cockerill. 2019. "Towards Another Kind of Borderlessness: Online Students with Disabilities." *Distance Education* 40 (2): 170–186. doi:10.1080/01587919.2019.1600369.
- Laufer, Melissa, Anne Leiser, Bronwen Deacon, Paola Perrin de Brichambaut, Benedikt Fecher, Christian Kobsda, and Friedrich Hesse. 2021. "Digital Higher Education: A Divider or Bridge Builder? Leadership Perspectives on Edtech in a COVID-19 Reality." *International Journal of Educational Technology in Higher Education* 18: 1–17. doi:10.1186/s41239-020-00238-7.
- Laurillard, Diana, Eileen Kennedy, Patricia Charlton, Joanna Wild, and Dionisis Dimakopoulos. 2018. "Using Technology to Develop Teachers as Designers of TEL: Evaluating the Learning Designer." *British Journal of Educational Technology* 49 (6): 1044–1058. doi:10.1111/bjet.12697.
- Lave, Jean. 1996. "Teaching, as Learning, in Practice." *Mind, Culture & Activity* 3 (3): 149–164. doi:10.1207/s15327884mca0303\_2.
- Lave, Jean, and Etienne Wenger. 1991. *Situated Learning: Legitimate Peripheral Participation*. New York, NY: Cambridge University Press.
- Leung, Jac K. L., and Samuel K. W. Chu. 2020. "Inspiring Makers in First-Year Engineering Under Emergency Remote Teaching." *Advances in Engineering Education* 8: 4.
- Mason, Matthew J., and Angela M. Gayton. 2022. "Active Learning in Flipped Classroom and Tutorials: Complementary or Redundant?" *International Journal for the Scholarship of Teaching and Learning* 16: 2. doi:10.20429/ijstol.2022.160206.

- McCune, Velda. 2021. "Academic Identities in Contemporary Higher Education: Sustaining Identities That Value Teaching." *Teaching in Higher Education* 26 (1): 20–35. doi:10.1080/13562517.2019.1632826.
- Merriam, Sharan B., and Elisabeth J. Tisdell. 2016. *Qualitative Research: A Guide to Design and Implementation, 4th Ed.* San Francisco, CA: Jossey-Bass.
- Nåstesjö, Jonatan. 2021. "Navigating Uncertainty: Early Career Academics and Practices of Appraisal Devices." *Minerva* 59 (2): 237–259. doi:10.1007/s11024-020-09425-2.
- Nowell, Lorelli S., Jill M. Norris, Deborah E. White, and Nancy J. Moules. 2017. "Thematic Analysis: Striving to Meet the Trustworthiness Criteria." *International Journal of Qualitative Methods* 16 (1): 1–13. doi:10.1177/1609406917733847.
- Pearson, Victoria, Kate Lister, Elaine McPherson, Anne-Marie Gallen, Gareth Davies, Chetz Colwell, Kate Bradshaw, Nicholas Braithwaite, and Trevor Collins. 2019. "Embedding and Sustaining Inclusive Practice to Support Disabled Students in Online and Blended Learning." *Journal of Interactive Media in Education* 2019 (1): 4. doi:10.5334/jime.500.
- Qashou, Abeer. 2022. "Obstacles to Effective Use of E-Learning in Higher Education from the Viewpoint of Faculty Members." *Turkish Online Journal of Distance Education (TOJDE)* 23 (1): 144–177.
- Rapanta, Chrysi, Luca Botturi, Peter Goodyear, Lourdes Guardia, and Margerite Koole. 2020. "Online University Teaching During and After the Covid-19 Crisis: Refocusing Teacher Presence and Learning Activity." *Postdigital Science and Education* 2: 923–945. doi:10.1007/s42438-020-00155-y
- Reinprecht, Constantin, Renata Suter, Bronwyn Parry, and Florian Rampelt. 2021. "No Longer a 'Lost Generation'? Opportunities and Obstacles of Online and Blended Learning Programmes for Syrian Refugees in Jordan and Lebanon." *Journal of Refugee Studies* 34 (3): 3197–3220. doi:10.1093/jrs/feab034.
- Romero-Ivanova, Christina, Michael Shaughnessy, Laura Otto, Emily Taylor, and Emma Watson. 2020. "Digital Practices and Applications in a COVID-19 Culture." *Higher Education Studies* 10 (3): 80–87. doi:10.5539/hes.v10n3p80.
- Säljö, Roger. 2010. "Digital Tools and Challenges to Institutional Traditions of Learning: Technologies, Social Memory and the Performative Nature of Learning." *Journal of Computer Assisted Learning* 26 (1): 53–64. doi:10.1111/j.1365-2729.2009.00341.x.
- Star, Susan Leigh, and James R. Griesemer. 1989. "Institutional Ecology, 'Translations' and Boundary Objects: Amateurs and Professionals in Berkeley's Museum of Vertebrate Zoology, 1907–39." *Social Studies of Science* 19 (3): 387–420. doi:10.1177/030631289019003001.
- Sutherland, Kathryn A. 2017. "Constructions of Success in Academia: An Early Career Perspective." *Studies in Higher Education* 42 (4): 743–759. doi:10.1080/03075079.2015.1072150.
- Vandeyar, Saloshna. 2021. "Educational Transmogrification: From Panicgogy to Pedagogy of Compassion." *Teaching in Higher Education*, doi:10.1080/13562517.2021.1952568.
- Volken, Thomas, Annina Zysset, Simone Amendola, Anthony K. Swormink, Marion Huber, Agnes von Wyl, and Julia Dratva. 2021. "Depressive Symptoms in Swiss University Students During the COVID-19 Pandemic and its Correlates." *International Journal of Environmental Research and Public Health* 18: 4. doi:10.3390/ijerph18041458.
- Vygotsky, Lev S. 1978. *Mind in Society. The Development of Higher Psychological Processes.* New Jersey: Harvard University Press.
- Vygotsky, Lev S. 1986. *Thought and Language. Translated and Edited by E. Hanfmann and G. Vakar.* Cambridge, MA: MIT Press.
- Vygotsky, Lev S. 1987. *The Collected Works of L. S. Vygotsky, Vol 1: Problems of General Psychology, ed. R. W. Rieber and A. S. Carton. Translated by N. Minick.* New York: Plenum Press.
- Wartofsky, Max W. 1979. *Models: Representation and the Scientific Understanding.* Dordrecht, the Netherlands: D. Reidel.
- Wenger, Etienne. 1998. *Communities of Practice: Learning, Meaning and Identity.* Cambridge: Cambridge University Press.

- Werner, A. M., A. N. Tibubos, L. M. Mülder, J. L. Reichel, M. Schäfer, S. Heller, D. Pfirrmann, et al. 2021. "The Impact of Lockdown Stress and Loneliness During the COVID-19 Pandemic on Mental Health among University Students in Germany." *Scientific Reports* 11 (1): 1–11. doi:[10.1038/s41598-020-79139-8](https://doi.org/10.1038/s41598-020-79139-8).
- Wertsch, James V. 1991. *Voices of the Mind: A Sociocultural Approach to Mediated Action*. Cambridge: Harvard University Press.
- Wilson, Kim. 2020. "What does it mean to *do* teaching? A qualitative study of resistance to flipped learning in a higher education context." *Teaching in Higher Education*. September 1.
- Yusuf, Byabazaire, and Mohammed Ahmed Taiye. 2021. "A Flipped Learning Environment: A Disruptive Approach for Traditional Classrooms?" *International Journal of Education, Psychology and Counseling* 6 (42): 83–98. doi:[10.35631/IJEPC.642008](https://doi.org/10.35631/IJEPC.642008)