

The most frequently used digital media type by far is computers/ laptops/ tablets (2020: 97%; 2021: 91%) and projectors. About two-thirds of respondents use smartphones or mobile phones (2020: 66%; 2021: 64%) in their courses. The high scores in these two categories indicate that familiarity with digital media types in the private sphere is reflected in their professional use. However, there are also some striking changes in the use of digital media types between the two survey rounds. The significant decline in the use of document cameras/visualizers (2020: 43%; 2021: 34%) could be due to a growing shift to online-only settings. Whereas in 2020, the use of digital media types seemed to depend fundamentally on the equipment available on the premises (“depending on what’s in the classroom”; G_I5: 8)⁵, on-site technical equipment plays a lesser role in the online-only settings overrepresented in 2021. The issue of equipment rather shifts to the equipment of the digital meeting room. This may also help explain the sharp increase in the use of digital cameras (2020: 32%; 2021: 49%). It is reasonable to assume that digital cameras – both those integrated in mobile devices and those attached externally – were now part of the necessary basic equipment to participate in online settings. Related to this is a growing awareness among continuing education staff of the range of digital media types available and thoughts on how to use them appropriately in teaching settings. Equipping rooms with digital media is not only an issue at organizations but also at the individual level as instructors think about professionalizing their media equipment at home: “Yes, well, I’m also upgrading here. I bought a tablet, and a pen, and some graphic thingy, one after another.” (G_I5a: 12).

In addition to equipping rooms with digital media, the organizations face the challenge of training and supporting their staff in using them: “Because if this is supposed to work really well, you also have to train the trainers.” (H_I7a: 9).

Digital tools

At both survey times, more than half of respondents used digital tools (Tab. 1). When asked to rate the effectiveness of these digital tools, respondents tended to give high ratings at both dates. Whereas in 2020 the high standard deviations point to a large variance in ratings, in 2021 staff seem to be able to rate the effectiveness of digital tools in a somewhat more focused way across the board.

⁵ The same persons were interviewed in both survey rounds. The first letter (A–H) denotes the organization. The combination of “I” and a number is used to identify the person interviewed at that organization (e.g., “I7”). The lower-case letter “a” marks the second interview date.

Table 1- Digital tools: Usage figures and effectiveness ratings

Digital tools	Use in %		Effectiveness ratings (1=not effective at all to 5 = highly effective)			
	Survey round 2020	Survey round 2021	Survey round 2020		Survey round 2021	
	N = 111	N = 424	N = 111		N = 424	
			M	SD	M	SD
Application software ⁶	86	76	4,43	1,1	4,37	0,9
Video conferencing applications	86	83	4,18	1,1	4,32	0,9
Learning and content management systems (LMS/CMS)	82	69	3,88	1,2	4,05	0,9
Online survey	66	63	3,58	1,4	3,86	1,0
Chat programmes	55	51	3,69	1,4	3,64	1,1
Cloud services	49	50	3,69	1,5	3,74	1,1

Interestingly, comparing the 2020 and 2021 figures reveals a striking 10% decrease in the use of application software although the effectiveness rating remains constant (2020: M = 4.43; 2021: M = 4.37). Whereas interviewees in the first survey mainly refer to presentation software as a basic digital tool (“we simply use PowerPoint”; B_I6: 28), the primary focus on application software seems to decrease somewhat at the second survey time. Application software does not become obsolete, but rather than being the main tool it is now one option for designing teaching-learning settings alongside a variety of other digital tools: “[...] now there is Zoom. But the way it is now, you need additional tools for it. It’s not enough to have PowerPoint, I also need a tool for collaboration. I don’t know, Padlet, or something else.” (H_I3a_DO: 55)

The high usage scores and effectiveness ratings for video conferencing apps (2020: 86%, M = 4.18; 2021: 83%, M = 4.32) must be read against the background of the developments starting with the Covid-19 pandemic. Prior to the pandemic, respondents used videoconferencing apps primarily as part of individual pilot projects (e.g., online-only or hybrid courses). At the time of the second interview survey, they were proficient in a range of different

⁶ To help respondents understand what is meant by each category, the questionnaire included examples (e.g., PowerPoint, Excel, Trello).

videoconferencing systems (E_I2a: 18), knew of their respective advantages and disadvantages (e.g., C_17a: 52; C_I12a: 12; G_I1a: 10), and made more extensive use of the additional functionalities provided by the platforms (e.g., breakout sessions, chat functions, integrated apps):

And so now we already work with group rooms, these breakout rooms. [...] I also see that with my trainers now. They more often use screensharing, additional apps, additional whiteboards that maybe offer more functions than the standard ones in virtual classrooms. (H_I2a: 14)

A sharp decline in usage among respondents is also evident for learning and content management systems (LMS/CMS) provided by continuing education organizations (2020: 82%; 2021: 69%). Their effectiveness ratings went up, however (2020: $M = 3.88$; 2021: $M = 4.05$). On the one hand, this might indicate that staff in 2021 were better able to choose and use LMS/CMS more appropriately for their own purposes than they were in 2020. The interview data show that LMS/CMS are used to support the teaching-learning process in asynchronous phases as well. Adult and continuing education staff see a wide range of possible applications, for instance as a knowledge documentation tool, as a place for exchanges with and among participants, or as information sharing platforms (e.g., F_I1: 25; C_I2a: 13; C_I13a: 44; H_I6a: 8). Usability is cited as the most important reason for or against using LMS/CMS: respondents state that using learning and content management systems makes sense if they are intuitive and easy to use.

Whereas the questionnaire only asked about online survey tools, the interviews of 2019/2020 show the use of additional online tools in a few isolated cases among respondents with a special interest in media education (e.g., E_I3: 12-13); in 2021, use of additional online tools was reported much more broadly. These tools are used to create quizzes, virtual bulletin boards, virtual surveys, learning modules, or project management workflows. Looking at both survey rounds, online tools are named primarily in connection with online offerings and less in connection with face-to-face offerings.

Chat apps (2020: 55%; 2021: 51%) and cloud computing services (2020: 49%; 2021: 50%) were used for classroom purposes by roughly half of the adult and continuing education staff at both survey times. The respective effectiveness ratings turn out to be relatively mediocre (2020: $M = 3.69$ & 3.69 ; 2021: $M = 3.64$ & 3.74), with an initially broad and then adequate standard deviation (2020: $SD = 1.4$ & 1.5 ; 2021: $SD = 1.1$ & 1.1). Supplementary analysis of the interview data shows that communicating via chat apps serves as an alternative to in-house organizational learning and communication platforms as a quick and easy way to manage organizational aspects of course delivery: “Organizing a course is easier, of course, if you have a WhatsApp

group.” (B_I10: 112). To comply with data protection regulations, chat apps are mainly used indirectly, with participants rather than staff using them on their own initiative as a quick communication tool. This may also explain the relatively high standard deviation in the effectiveness ratings. At the same time, however, it can be seen that some staff are critical of commercial chat apps for data protection reasons (e.g., H_I2: 15; G_I3: 32).

Didactically structured digital media offerings

Concerning the use of didactically structured digital media offerings, a greater variety and clear differences in the effectiveness ratings at both survey times can be seen (see Fig. 4)⁷. Whereas the 2020 data still show strong variation in respondents’ assessment of the benefits of individual digital media offerings, the connection between usage and effectiveness ratings becomes clear in 2021. In both, the 2020 and 2021 data, educators give higher effectiveness ratings to those digital media offerings that they have used more frequently. Media offerings used by only a few respondents receive lower ratings. This may indicate that certain media offerings, such as experimentation and simulation environments or intelligent tutorial systems (ITS), are less frequently available in the organizations. This would mean that necessary general prerequisites for piloting and building up experience are lacking.

Overall, it is apparent that adult educators mainly use those media offerings that are already fully developed and can be easily used in the classroom. These include videos, which are used in the classroom by a high share of respondents (2020: 81%; 2021: 78%) and whose effectiveness is rated as very high (2020: M = 4.2, SD = 1.0; 2021: M = 3.98, SD = 0.9). Supplementary analysis of the interview material shows that fully produced videos (e.g., on platforms such as YouTube) are readily used in course settings given their easy availability, and because it does not matter how the course is delivered (online only, face-to-face, or blended/hybrid):

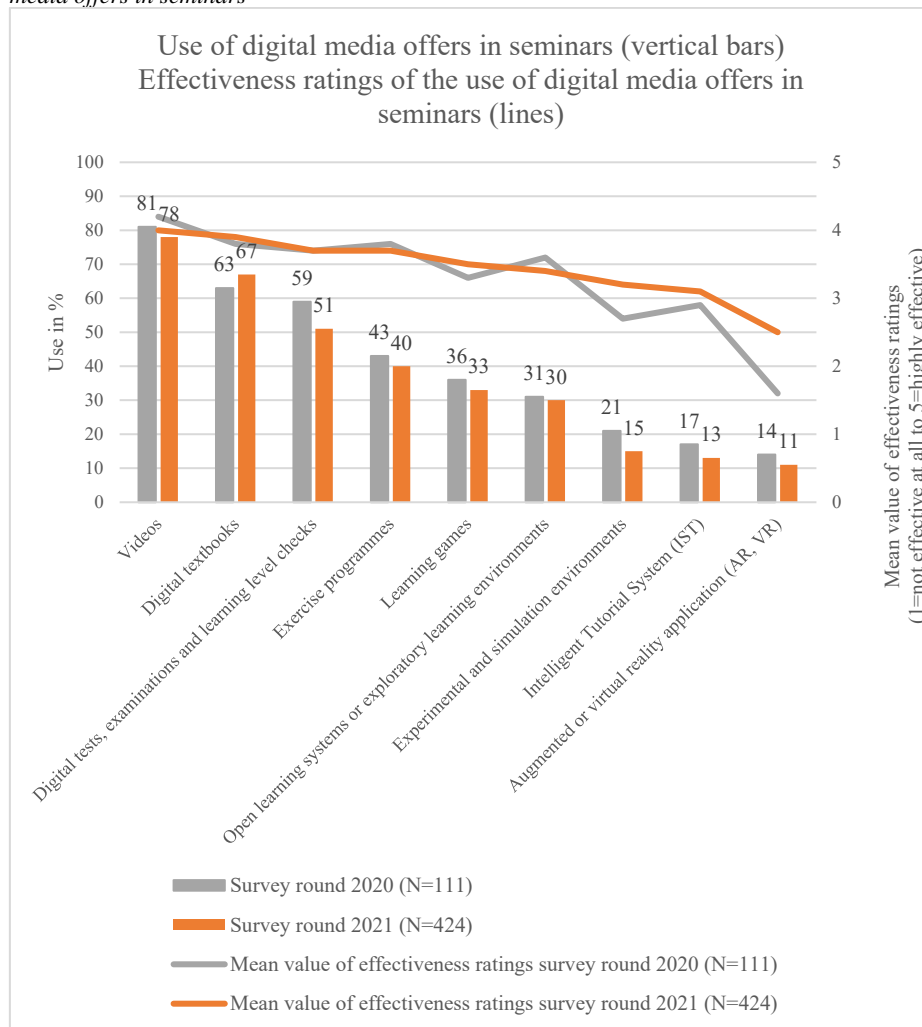
Showing films, for example, is something I can do quite well. [...] In the past, people used to sit together in the same room, watched the film and then talked about it. Now that is done digitally. And it works, too. (C_I8a: 16)

It is less common for videos to be specifically designed for teaching purposes and then made available as a digital medium to be used in the classroom. Creating such videos involves prior didactic planning of the course

⁷ To help respondents understand what is meant by each category, the questionnaire included examples (e.g., YouTube, Media Library).

setting, for example, on how to guide and support participants during asynchronous phases of self-directed learning, as illustrated by the following example: “blended learning, then of course we have videos [...] that are specifically adapted to this. [...] available for them as a resource if they want to go deeper [...].” (H_15: 21)

Figure 4 - Use of digital media offers in seminars and effectiveness ratings of the use of digital media offers in seminars



Two-thirds of staff interviewed used digital textbooks provided to them, with a slight increase in usage rates (2020: 63%; 2021: 67%) and in

effectiveness ratings (2020: $M = 3.77$; 2021: $M = 3.92$). The interviews show that whether or not instructors use digital textbooks depends, among other things, on their being available at the organization or on their being purchased via umbrella organizations or external providers, such as publishers (e.g., B_I2: 4; F_I6: 48).

For all other digital media offerings, there is a decline in usage by the second survey round. This is also reflected in the interviews, in which respondents talk less about more complex media offerings. One possible explanation for this might be the nationwide switch to online settings, which forced organizations and staff to devote most of their attention to this effort and to concentrate many resources on creating the necessary infrastructures, installing the required hardware, and developing suitable teaching concepts.

A more detailed look at practice programmes enabling learners to practice and consolidate learning content shows that 43% (2020) and 40% (2021) of respondents use them in their courses. In 2021, around half of the respondents (51%) still used digital tests, examinations, and learning progress assessments in their courses. The use of digital tests, particularly in continuing vocational training, is closely linked to the curricular structures of the specific training programme for which they are developed (e.g., G_GD: 21). Moreover, they are used when they are provided by the organizations. Usually these are practice programmes for learners to use on their own.

Digital learning games (2020: 36%; 2021: 33%) and open teaching systems or explorative learning environments and teaching programmes (2020: 31%; 2021: 30%) are used less frequently by respondents⁸. One respondent talks about an open learning environment elaborately created by the organization (F_GD: 28). This indicates that the organization must provide extensive resources for its development. At the same time, such learning environments change the role of teachers: the content and suitable teaching approaches have already been prepared by the organization, leaving teachers to serve more as facilitators supporting the learning process.

The questionnaire data show less usage of experimental and simulation environments (2020: 21%; 2021: 15%), intelligent tutorial systems (ITS) (2020: 17%; 2021: 13%), which adapt to learners' knowledge and skills, and augmented or virtual reality applications (AR, VR) (2020: 14%; 2021: 11%). This suggests there are hardly any offerings available for use in adult education settings and that developing such offerings is considered to be very time-consuming. Again, we see that educators tend to use media that are already fully

⁸ Open teaching systems or explorative learning environments provide content in a hypermedia format and in a manner suitable for teaching. Teaching programmes also offer didactic guidance to help learners navigate the learning process.

developed and can be used quickly and easily. Development and usage require extensive time and financial resources; moreover, the organization must provide the necessary infrastructure.

Digitalized data repositories as another type

Based on our analysis of the interview material, the original typology of digital media can be expanded to include the area of digitalized data repositories. These include, for example, digital legal texts, subject-specific databases, digital translation tools, vocabulary databases, or platforms providing video material on various topics. These data repositories, which are available online for the most part, are used by staff to prepare and conduct teaching-learning settings. This type of digital material is not specifically prepared to be used for teaching; rather, instructors use it based on their didactic planning and implementation of teaching-learning settings.

Conclusion

Breaking digital media down into digital media types, digital tools, and didactically structured digital media offerings provides a detailed insight into how digital media are used by adult and continuing education staff. With respect to media types, on the one hand, their usage is a macrodidactic question of room planning and media availability linked to the framework conditions in the organizations. On the other hand, the shift of teaching-learning settings into digital space means that questions of media usage are increasingly individualized, with individual instructors incorporating microdidactic considerations into their work. The strongest development is evident in the use of digital tools. Adult educators can become familiar with a wide range of digital tools and they are quickly and directly available, as well as easy to use. Adult education organizations and umbrella organizations have resolved licensing issues and established the digital infrastructure (e.g., hardware, bandwidth, power supply) and provide a stable and reliable framework for implementation. To some extent, this is also true of didactically structured digital media offerings. The latter often involve an elaborate development process or require costly licenses. It can be assumed that efforts in this direction have been put on hold at many organizations given the challenging situation of the past two years. The addition of a fourth type – digital data repositories – points to current and future dynamics and trends in the use of digital media. In summary, it is possible to draw some conclusions that are likely to be relevant to the use of digital media in adult and continuing education.

Key role of organizations and umbrella organizations in making digital media available

It is important to emphasize the key role of organizations and umbrella organizations. They play a major role in purchasing digital media and making them available for use (e.g., hardware, development of more comprehensive concepts, licenses for using tools). In this effort, they must engage in macrodidactic-level reflections not only about content planning but also about marketing their own educational programmes, for instance via social media (Grotlüschen, 2018). This perspective also includes recruiting, hiring, and professionalizing staff. The results suggest that it is not enough to just make digital media available; staff and instructors must be taught how to use them, for instance through suitable staff development measures and training programmes (Breitschwerdt & Egetenmeyer, 2021). Likewise, it is crucial to provide informal opportunities to try out digital media in the facility. The interview material points to the need for an organizational culture that is supportive and open in dealing with uncertainties in the use of digital media to motivate staff. In summary this illustrates, on the one hand, the value of focusing more on organizations in research, for instance regarding a culture conducive to digitalization. On the other hand, it reveals essential aspects for the organization themselves that appear relevant for digitization-related organizational development, such as personnel development that enables both formal and informal opportunities for professionalization. With regard to the umbrella organizations, the results also point to their importance in creating structures in negotiation with political actors, for instance concerning funding and the legal framework of digital media use.

Distinction between micro- and macrodidactic considerations

Overall, the results show that digital media are already widely used in the organizations surveyed. At the same time, this clearly changes the role of the organizations. Aside from shifting the content-related and didactic management of programmes and offerings involving digital media to the macrodidactic level, this affects organizational and staff development processes that address these digitalization-related changes and establish an organizational culture that leads to a joint development of adequate concepts of digital media usage. This clearly illustrates that using digital media requires didactic considerations at the macrodidactic planning level (Fleige et al., 2018; Fleige et al., 2018; Hippel et al., 2018). A framework must be established at the organizational level to address questions about equipping rooms with digital media types (e.g., interactive whiteboards), making digital tools available (e.g.,

videoconferencing apps, learning and content management systems), and establishing didactically structured digital media offerings (e.g., digital textbooks, open teaching systems). Developing more complex media offerings requires cooperation with the instructors to create a didactically meaningful framework for using digital media. This calls for establishing basic collaborative strategies between teaching and planning staff. More detailed research is needed, especially regarding the planning staff, who will in the future be increasingly involved in didactic questions in the planning phase.

Changing staff roles

The use of digital media changes not only the requirements for the didactic actions of staff involved in programme planning but also the role of instructors, who increasingly become learning facilitators supporting teaching-learning processes (e.g., Schüepf, 2018; Sgier et al., 2018). Furthermore, new roles are emerging that are responsible for providing technical support to teaching-learning settings, for example (e.g., Zierock, 2016). The challenge here is that these new roles are not necessarily performed by additional staff, but rather become an additional responsibility of instructors themselves. Organizations provide a media framework in terms of digital media, which is not only provided for the participants but also guides the didactic options of the instructors. In the future, adult education will have to deal with how to address the demands on teaching and learning settings, which are becoming more complex with the increasing use of digital media. This raises basic didactical questions, including ways of implementing these didactic concerns in the organisational culture, for example, how to involve and support participants in their media use or how to facilitate cooperation between different actors (e.g., facilitator, technical support, etc.) around the design of teaching and learning settings.

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