Media Usage Behaviors of Learners in ODDE

Ji Yae Bong and Zhichun Liu

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Abstract

In the digital era and with the prevalence of media usage in open, distance, and
digital education, learners increasingly use media to facilitate their learning in
various ways. Media usage in today’s learning environment ranges from watching
a video or listening to a podcast to annotating a digital book collaboratively or
sharing thoughts on Twitter. Learners demonstrate diverse media usage behaviors
under different settings for different purposes. The goal of this chapter is to
provide a comprehensive overview of learners’ media usage in open, distance,
and digital education settings. In this chapter, the authors first review the devel-
opment of media usage in open, distance, and digital education, as well as learner
media usage behavior as a research-agenda shift from a contemporary research

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and practice perspective. Next, the diverse learner typologies regarding media usage behaviors, as well as research on learner media usage and its implications, are discussed. The chapter concludes with an outlook on media usage in open, distance, and digital education and research directions in the near future. Understanding learners’ media usage will guide research on how to promote learning with the facilitation of media and provide insights into the design and development of future open, distance, and digital education.

**Keywords**

Media usage · Instructional media · Social media · Learner behavior · Open education · Distance education · Digital education

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### Introduction

Open, distance, and digital education platforms are often purported to promote equity by extending education to a larger population and to empower learners by focusing on learners’ agency (Bozkurt, 2019). In the digital era, this mission is closely related to the adoption of various forms of media. Media are used “to present course content and to facilitate interaction and collaboration (Dolch et al., 2021: p. 32).” As media become an increasingly important mediator between learners and open, distance, and digital education, the attendant research focus has shifted from designing or implementing instructional media to promote learning to a student-centered research agenda of investigating how learners can use media to support their own learning.

Although media and technologies are not new to learning, which relies on communication (Bateson, 1972: p. 279), the development of media has led to a wide range of media-related learning activities. In the past, distance learning relied heavily on one-way communication such as radio or instructional television (Saettler, 1990). Today, learners can actively use multimedia and social media to immerse themselves in a much more interactive, collaborative, and networked open and distance learning experience. The goal of this chapter is to review the development of media and learners’ media usage, discuss the research on learners’ media usage behaviors in open, distance, and digital education, and finally, provide insights to inform future research on how to understand and support learning in open, distance, and digital education settings.

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### Media Evolution in Open, Distance, and Digital Education: A Historical View

Open education and distance education have very long histories and cover a wide range of activities facilitated by various forms of media. The idea of open education dates back to as early as the middle ages when universities grew out of cathedral
schools under the name of *stadium generale* (Peter & Deimann, 2013), which aimed at spreading knowledge within the entire Christendom regardless of nationality or boundaries (Riddle, 1993). Although media usage was minimal at that time, in the mid-eighteenth century, media started to facilitate learning via correspondence education (an early form of distance education) due to the advancement of print media. For example, in 1840 Issac Pitman offered shorthand instruction to the public via letters delivered by England’s penny post (Simonson et al., 2019). Later, the development of media at the beginning of the twentieth century (e.g., motion pictures and public radio) made open and distance learning much more accessible (Saettler, 1990). As various media continued to develop, early open and distance education evolved from using print-based learning materials to multimedia and mass communication technologies (Sumner, 2000). For example, instructional television and satellite technologies helped open and distance education reach a broad population (e.g., Open University in UK and TI-IN Network in USA).

Open and distance education started to spread even more widely when it becomes digital with the onset of personal computers and Internet technologies. Although interest in computer-assisted learning garnered minimal attention before the 1980s, experimentation with this format began much earlier (Reiser, 2007). For example, IBM researchers developed the first computer-assisted instruction author language and brought it to public schools as early as the 1960s (Atkinson & Hansen, 1966). As computers and the Internet become increasingly accessible, learning options took on new forms, such as self-paced modalized learning content, interactive learning environment, real-time two-way video conferencing, and so on (Sumner, 2000).

From Learning from Media to Learning with Media

In the early stages of media development, educators and researchers focused mostly on how to design media to deliver instructional content. Proponents of different media technologies were enthusiastic about the “revolutionary change” each medium would bring to education. For example, in the 1930s, the National Education Association predicted radio in education would be as common as books, but the passion was short-lived (Reiser, 2007). Similar stories are associated with other media, such as instructional television, satellite technologies, personal computers, and more recently, MOOC. This view was described by Jonassen (1996) as learning *from* technology, because the medium is considered as nothing more than a delivery tool. Under this view, education is centered around the designers and developers of instructions and learning. For example, teachers are responsible for deciding what media technologies (e.g., print-based media, multimedia, or video conferencing) are best for delivering the instruction. However, when the content and the learning facilitated by media are ignored, these discussions are often limited (Clark, 1983).

In contrast to learning *from* media, Jonassen (1996) proposed learning *with* media. Under this view, a medium is a tool that facilitates learning. Open, distance, and digital learning today are no longer one-way communications from teachers to learners. These learning formats are now considered socially constructed activities.
and as networked, distributed, and collaborative activities. In this type of learning, learners take the initiative for their learning and construct their own personal learning networks. Instead of serving merely as a delivery tool, media mediate between learners and their learning. As a result, research has emerged emphasizing learners’ agency and media usage behaviors. It is increasingly important to understand learners’ media usage preferences and patterns so that researchers can best support their learning.

This view shift surrounding media-based learning did not happen out of thin air. Rather, it has been in concert with the development of media throughout the twenty-first century. Due to the popularity of personal devices and social media, agency surrounding educational media began to shift to the learners’ side. Researchers began to notice the power of self-initiated learning from networks and communities (i.e., networked learning). For example, the American Society for Training and Development (2009) reported that 67% of the employees in business and industry were using online communities of practice to support their performance in 2008.

In a twenty-first-century context, media usage encompasses a wide range of different technologies and applications, and learners use media for different purposes. Learners now are equipped with more and more choices. Zawacki-Richter et al. (2015) surveyed 2339 students from full-time, part-time, face-to-face, and distance programs in German universities on their media preferences for learning. Across all students, the highest-rated media tools included search engines, email, printed texts, and word processing tools, while social media tools including podcasts, microblogging, and social bookmarking were not well-liked by all students. Nontraditional students (e.g., students enrolled in distance programs or part-time) reported significantly higher acceptance of many of the aforementioned e-learning tools. Thompson (2013) identified nine uses for media among college students, who often get labeled as “digital natives”: (a) rapid communication technology, (b) multimedia creation, (c) active web reading and writing, (d) gaming, (e) web resource use, (f) collaborative web tool use, (g) productivity tool use, (h) microblogging, and (i) nondigital book reading. These different purposes for using media can lead to a diverse range of learning behaviors and opportunities (see Table 1). Among the nine uses, students’ positive view of using rapid communication (e.g., texting) and microblogging (e.g., tweeting) for learning is mostly correlated with students seeing themselves as more “digital” in terms of claims being made about the digital generation. With the transition from traditional learning to digital, open, and distance learning, learning today is becoming very different from learning in the past.

Learning today is becoming increasingly democratized and often happens in diverse learning environments. Internet technologies and personal devices make information communication accessible at almost all times. Many families now own multiple devices. For example, more than half of US households own more than five digital devices, such as smartphones, desktops, laptops, tablets, or streaming devices (Pew Research Center, 2017). Learning today occurs in many different and informal settings (e.g., viewing a YouTube tutorial). Such types of learning opportunities are typically voluntary and embedded in real-world contexts.
As the context of learning is becoming more diverse, learning interactions are now often mediated by social tools and rely on user-generated content. Learners can form and join communities of practice and construct knowledge collaboratively with the help of social media. Although research on the effect of incorporating social media into learning is ongoing, research has shown promising results on how social media can facilitate learning in various settings. For example, Schroeder and Greenbowe (2009) introduced Facebook as a course communication tool in an introductory chemistry course. Students enrolled in the Facebook group generated nearly four times the number of posts compared to the posts generated by students who used the learning management system.

<table>
<thead>
<tr>
<th>Media factors (Thompson, 2013)</th>
<th>Learning opportunity/behavior examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rapid communication technology</td>
<td>Learners can use rapid communication technologies to facilitate community building and collaboration in their learning (e.g., Sotillo, 2006)</td>
</tr>
<tr>
<td>Multimedia creation</td>
<td>Learners can create multimedia content to reflect their learning outcomes, which engages a wide range of skills and encourages sharing within communities (e.g., Hernández-Ramos &amp; De La Paz, 2009)</td>
</tr>
<tr>
<td>Active web reading and writing</td>
<td>Learners can consume and produce resources beyond print media, which can be more flexible, ubiquitous, and interactive (e.g., Behjat et al., 2012)</td>
</tr>
<tr>
<td>Gaming</td>
<td>Learners can construct their knowledge and acquire skills through simulated and highly interactive environments (e.g., Shute et al., 2020)</td>
</tr>
<tr>
<td>Web resource use</td>
<td>Learners are equipped with more accessible resources from various sources and in diverse formats (e.g., Afreen, 2014)</td>
</tr>
<tr>
<td>Collaborative web tool use</td>
<td>Learners can use collaborative web tools to facilitate collaboration (Chen &amp; Chen, 2014)</td>
</tr>
<tr>
<td>Productivity tool use</td>
<td>Learners are equipped with productivity tools (e.g., word processing tools, spreadsheets, databases, presentation tools) to produce content in various forms.</td>
</tr>
<tr>
<td>Microblogging</td>
<td>Learners can share, collect, broker, negotiate, and construct knowledge through a social network linked by microblogging tools (e.g., Dennen, 2019)</td>
</tr>
<tr>
<td>Nondigital book reading</td>
<td>Learners can consume resources in print media</td>
</tr>
</tbody>
</table>

As the context of learning is becoming more diverse, learning interactions are now often mediated by social tools and rely on user-generated content. Learners can form and join communities of practice and construct knowledge collaboratively with the help of social media. Although research on the effect of incorporating social media into learning is ongoing, research has shown promising results on how social media can facilitate learning in various settings. For example, Schroeder and Greenbowe (2009) introduced Facebook as a course communication tool in an introductory chemistry course. Students enrolled in the Facebook group generated nearly four times the number of posts compared to the posts generated by students who used the learning management system.

**Learners’ Media Usage Behaviors**

Media provide learners a range of opportunities for supporting learning practices, as discussed in the previous section. This section focuses on learners’ behaviors regarding media usage. With abundant learning options, learners behave differently.
in diverse media-integrated learning spaces. Additionally, diverse learners do not behave in the same manner even in the same media-enhanced learning space. It is important to map the typologies of learners and understand learners’ media usage behaviors in order to support their learning accordingly. Researchers have identified different typologies (i.e., types of usage patterns) due to varying areas of focus, such as different users, media, and contexts. As an effort to provide a comprehensive set of typologies, the authors intentionally chose nine media usage typologies to describe in this section. In this section, the authors describe each typology or media usage pattern and explain how the researcher(s) built it by examining its context (e.g., users, media, and learning contexts) and the set of dimensions chosen and used by the researcher(s) to distinguish usage behaviors. At the end of this section, the authors provide a list of dimensions that can be considered to identify new media usage behaviors for future studies and discuss the implications of media usage typology research.

**Media Usage Typologies: Media in General**

Media user typology categorizes users into distinct user types that describe the various ways individuals use different media, considering a set of dimensions such as frequency of use and variety of use (Brandtzaeg, 2010). Brandtzaeg (2010) reviewed 22 studies on media usage typologies from 2000 to 2009 and suggested the Media-User Typology (MUT), consisting of eight types of media users: (a) nonusers, (b) sporadics, (c) debaters, (d) entertainment users, (e) socializers, (f) lurkers, (g) instrumental users, and (h) advanced users (see Table 2 for definitions of each type of media user). Each type of media user demonstrates distinctive media behaviors that are explained by a set of dimensions such as frequency of use, variety of use, typical activity, and typical media platform used. This well-known typology has provided a comprehensive classification of general media usage. However, Brandtzaeg’s typology did not emphasize learners and educationally relevant usage patterns, as he reviewed studies targeting different populations and involving general activities including those unrelated to learning, such as online shopping and gaming (Dolch et al., 2021).

More recently, researchers have targeted learners and identified their media usage typologies. Zawacki-Richter et al. (2015) investigated media usage patterns of traditional and nontraditional students at German universities. The researchers considered dimensions such as frequency of use, digital learning formats/tools (e.g., virtual seminars, lecture recordings, etc.), and activities (e.g., recreational use and use for learning) and identified four types or profiles of media usage patterns pertaining to students: (a) entertainment users, (b) peripheral users, (c) advanced users, and (d) instrumental users. The researchers also found that, unlike with traditional students, the proportion of instrumental users was high among nontraditional students.

Dolch et al. (2021) conducted a longitudinal study exploring changing media usage patterns of German higher education students over time (in 2012, 2015, and
<table>
<thead>
<tr>
<th>Study subjects and authors</th>
<th>User types or usage behaviors</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diverse groups of users</td>
<td>Media-user typology (MUT)</td>
</tr>
<tr>
<td>(Brandtzaeg, 2010)</td>
<td>(a) Nonusers: Do not use any media</td>
</tr>
<tr>
<td></td>
<td>(b) Sporadics: Use any kind of media to do nonparticular activities with low frequency and low variety of use</td>
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<tr>
<td></td>
<td>(c) Debaters: Use media such as blogs and social networking sites (SNS) at a medium level of frequency for discussion and information acquisition and exchange</td>
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<tr>
<td></td>
<td>(d) Entertainment users: Use new media in general at a medium level of frequency for entertainment purposes such as gaming, passively watching videos, and shopping</td>
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<tr>
<td></td>
<td>(e) Socializers: Use SNS at a medium level of frequency to socialize, connect with friends and family, and make new acquaintances</td>
</tr>
<tr>
<td></td>
<td>(f) Lurkers: Spend passive time using SNSs, user-generated sites, shopping, and other media in general at a medium level of use and with low variety of use</td>
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<tr>
<td></td>
<td>(g) Instrumental users: Choose media content for information with specific intentions, such as comparing brands and promotional offers when shopping. They use media in general at a medium level and medium variety of use</td>
</tr>
<tr>
<td></td>
<td>(h) Advanced users: Engage in diverse activities, including the activities mentioned earlier, at a high level of frequency</td>
</tr>
</tbody>
</table>

| German higher-education students | (a) Entertainment users: Frequently use internet/online media (e.g., chats, music download/streaming, search engines, social networks, etc.) for entertainment purposes or subjective benefits |
| (traditional and nontraditional) | (b) Peripheral users: Show low application and acceptance of all media, tools, and services |
| (Zawacki-Richter et al., 2015)   | (c) Advanced users: Use e-learning tools, social networks for learning, and online media for entertaining purposes |
|                                | (d) Instrumental users: Frequently use office software (e.g., text processing, spreadsheets, etc.) |

| German higher-education students | (a) Entertainment users: Use the internet, especially social media, often for leisure purposes |
| (Dolch et al., 2021)             | (b) Intensive users: Use the internet, social networks, and e-learning tools for learning and use the internet for leisure. |
|                                | (c) Peripheral users: Comparatively show the lowest use and acceptance of media. |
|                                | (d) Utilitarian users: Use office software and e-learning tools often – The use of social media for learning and use of the internet for leisure were less important to the utilitarian users |
The identified media usage types were (a) entertainment users, (b) intensive users, (c) peripheral users, and (d) utilitarian users. The researchers considered dimensions such as frequency of use, variety of use, digital learning formats/tools, and activities to identify these four types. Approximately half of the students were entertainment users all three years, and these students used the Internet – especially social media – frequently for leisure purposes. The type of users that increased considerably over time were intensive users, who used the internet, social networks, and e-learning tools for their learning, as well as the internet for leisure. The other two types of users, peripheral users and utilitarian users, decreased slightly in 2018. The researchers assumed that their findings reflected a media trend in the use of e-learning tools. They also suggested that educators and instructional designers should improve the use of e-learning tools, SNS, and recreational tools for teaching and learning in higher education.

**Media Usage Typologies: Learning-Related Usage Behaviors and Media Trends**

Researchers have also explored learners’ media usage patterns in more granular ways by focusing on specific usage behaviors or considering media trends such as social media and open learning platforms. First, there have been typologies or frameworks focusing on the acts of knowledge building or sharing. Dennen (2019) suggested the Networked Knowledge Activities (NKA) framework, articulating six discrete knowledge-related media user behaviors in networked learning contexts such as social media, online classrooms, or virtual communities of practice. These six behaviors are (a) collect, (b) curate, (c) share, (d) broker, (e) negotiate, and (f) construct (see Table 3 for definitions of each behavior/knowledge activity). The NKAs tend to co-occur and to flow from one to another during the learning process. Dennen et al. (2020) examined learning-related social media usage behaviors while applying the NKA framework to the archival data from six major SNS: Facebook, Twitter, Instagram, LinkedIn, Pinterest, and YouTube. The observed NKAs were discussed considering the technological affordances of the SNS. While Dennen et al.’ (2020) study shows one way to capture learners’ learning-related activities in informal learning contexts, it also illustrates the potential for context collapse, since SNS can be used as both learning and nonlearning spaces.

Given the prevalence of social media, researchers have examined its usage in general. Özlü and Kalyoncuoglu (2017) identified six types of higher-education student users of social media platforms in Turkey. The dimension their typology considered was cognitive use (passive and active). The types identified were (a) movers and shakers, (b) game lovers, (c) abstainers, (d) followers, (e) sharers, and (f) socializers. Breines et al. (2020) specifically targeted international distance education students and explored their nonuse of social media and developed a typology of social media nonuse. Their typology has four themes: (a) exclusion owing to access issues or the social environment on social media; (b) distrust due to issues of authenticity, security, privacy, and noncollaboration; (c) distraction due to
<table>
<thead>
<tr>
<th>Study subjects and authors</th>
<th>User types or usage behaviors</th>
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</table>
| Archival data from six major SNS: Facebook, Twitter, Instagram, LinkedIn, Pinterest, and YouTube (Dennen et al., 2020) | Networked knowledge activities (NKA) framework  
(a) Collect: Collect items or information they find  
(b) Curate: Purposefully create organized or annotated collections of online items or artifacts  
(c) Share: Share their collected or curated items online  
(d) Broker: Connect online and offline groups or networks via knowledge transmission  
(e) Negotiate: engage in a collaborative and discursive process in which learners work together to agree upon meaning  
(f) Construct: Construct knowledge and create a product that can be shared with others by making something new or combining existing things in a new manner. |
| Higher-education student users of social media platforms in Turkey (Özlü & Kalyoncuoglu, 2017) | (a) Movers and shakers: Actively create original content and multimedia content  
(b) Game lovers  
(c) Abstainers: Use and consume content at the low level  
(d) Followers: Actively consume and share content as a twitter user  
(e) Sharers: Consume content and intensively criticize or share the content  
(f) Socializers: Intensively interact with content, play games, and use twitter actively, but do not create original content |
| International distance education students (Breines et al., 2020) | Typology of nonuse of social media (themes)  
(a) Exclusion owing to access issues or the social environment on social media  
(b) Distrust due to issues of authenticity, security, privacy, and noncollaboration  
(c) Distraction due to overwhelming or irrelevant information, interactions, or communication  
(d) Online discrimination |
| MOOC learners (Kizilcec et al., 2013) | (a) Completing: Completed the majority of the assessments  
(b) Auditing: Watched video lectures but completed assessments infrequently if at all. Also, followed the course for the majority of its duration  
(c) Disengaging: Completed assessments at the beginning of the course but then either disappeared from the course entirely or participated sparsely  
(d) Sampling: Watched video lectures for only one or two assessment periods |

(continued)
overwhelming or irrelevant information, interactions, or communication; and (d) online discrimination.

Open learning platforms, including MOOCs, have also become increasingly available to the public. Due to some of their main features such as openness and scalability, more diverse user profiles or media usage behaviors have been identified compared with those in formal learning management systems (LMS). Kizilcec et al. (2013) identified four types of behaviors: (a) completing, (b) auditing, (c) disengaging, and (d) sampling. Ferguson and Clow (2015) provided a typology that included seven profiles: (a) samplers, (b) strong starters, (c) returners, (d) mid-way dropouts, (e) nearly there, (f) late completers, and (g) keen completers. Poellhuber and Bouchoucha (2019) examined open learners’ engagement quantitatively and qualitatively and identified six different MOOC user profiles. They are (a) ghost (no-shows), (b) browser, (c) self-assessor, (d) serious reader, (e) active-independent, and (f) active social. To identify MOOC learner typologies, scholars have commonly considered variables such as engagement level, type and quantity of

Table 3 (continued)

<table>
<thead>
<tr>
<th>Study subjects and authors</th>
<th>User types or usage behaviors</th>
</tr>
</thead>
<tbody>
<tr>
<td>MOOC learners (Ferguson &amp; Clow, 2015)</td>
<td>(a) Samplers: Watched some course videos (b) Strong starters: Completed the first assessment of the course, but then dropped out (c) Returners: Completed the assessment in the first week, returned in the next week, and then dropped out (d) Mid-way dropouts: Completed three or four assessments, but then dropped out about halfway through the course (e) Nearly there: Consistently completed assessments but then dropped out before the end of the course (f) Late completers: Completed most of the assessments, but were either late or missed out (g) Keen completers: Engaged actively and completed the course</td>
</tr>
<tr>
<td>MOOC learners (Poellhuber &amp; Bouchoucha, 2019)</td>
<td>(a) Ghost: Engaged in no or almost no activity during the second and third weeks of the course (b) Browser: Viewed some videos or other resources. Their activity level was very low (c) Self-assessor: Completed most of the quizzes and tests (d) Serious reader: Actively viewed and read course materials (e) Active-independent: Actively engaged with all of the learning components/activities at least once (f) Active social: Engaged with everything that was expected in the MOOC</td>
</tr>
</tbody>
</table>
activities/items students completed, and students’ individually chosen timelines for their learning.

Dimensions in Media Usage Typologies

The studies discussed above reported different types of usage patterns because they had varying focuses, such as different users (e.g., general users, higher-education learners, workers, or open learners), different media (e.g., media in general, social media), and/or different contexts (e.g., daily life, formal, or informal learning contexts). The researchers also considered different sets of dimensions to build these typologies and media usage patterns. Many extant typologies share some common dimensions, but also contain unique dimensions or criteria. The dimensions used in previous research are summarized in Table 4. This list of dimensions is useful for researchers who want to identify new media usage typologies in their specific study contexts. The vast amount of potential media usage patterns or typologies can be captured by identifying new sets of dimensions based on those given in the summary (Table 4), as well as having different levels or categories for each dimension.

Educators and practitioners can also consider the work summarized in this chapter to assist themselves in understanding the vast diversity of learners’ media usage. Additionally, these media usage behaviors or typologies can help educators and instructional designers capture both major and minor media-adoption groups of learners and their needs when designing, developing, and facilitating media-enhanced learning. Learners can also consult the summarized typologies to reflect on their media usage behaviors for learning and find different and better ways to use media to maximize their learning experiences. Typologies assist scholars engaging in research on learners’ media usage behaviors. For example, researchers have made predictions regarding how diverse user types respond to different media usage patterns (Brandtzæg, 2010). Policymakers and administrators can also consider the typologies and develop digitalization strategies (Dolch et al., 2021). Due to the increasingly complex media landscape and its diverse uses, it is challenging to characterize the nature of media usage behaviors and distinctive user profiles/types. It is also widely acknowledged that the “design” aspect of media-enhanced learning spaces plays a key role in the way learners use media. Well-designed media-enhanced learning supports learners’ behaviors concerning knowledge management, creation, communication, and collaboration.

Research in Learners’ Media Usage Behaviors

Researchers have studied media, technologies available for learning, and learners’ media usage behaviors in diverse learning contexts. Three themes of research have expanded the media usage typology research: (a) the potential learning consequences associated with media usage, (b) factors impacting media usage behaviors
<table>
<thead>
<tr>
<th>Dimensions</th>
<th>Levels or categories of each dimension</th>
<th>References</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>General usage</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Use or nonuse</td>
<td>Yes or no</td>
<td>Zawacki-Richter et al. (2015)</td>
</tr>
<tr>
<td>Frequency of use</td>
<td>o [level] very often, . . . , never o [level] several times daily, . . . , never o [level] almost every day, a few times a week, between once a week and once a month, less than once a month, never</td>
<td>Dolch et al. (2021) and Zawacki-Richter et al. (2015)</td>
</tr>
<tr>
<td>Variety of use</td>
<td>o Utility oriented (often work-related). o Entertainment/hedonic usage (e.g., gaming). o Socializing. o Multiple activities.</td>
<td>Özlü and Kalyoncuoglu (2017) and Zawacki-Richter et al. (2015)</td>
</tr>
<tr>
<td><strong>Media</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Media, tools, programs</td>
<td>o All/different media including internet in general, e-learning tools, and office software. o Social media. o Open learning platforms (e.g., MOOCs).</td>
<td>All studies reviewed</td>
</tr>
<tr>
<td>Digital formats/ functions</td>
<td>o Online-media: Chats, music download/streaming, social networks, wikis, search engines, etc. o Digital learning formats: Virtual seminars, web-based trainings, e-portfolios, virtual labs, lecture recordings, online-tests, podcast, etc.</td>
<td>Dolch et al. (2021) and Zawacki-Richter et al. (2015)</td>
</tr>
<tr>
<td>Perceived acceptance</td>
<td>o [level] very useful, . . . , not useful at all o [level] very important, . . . , not important at all</td>
<td>Dolch et al. (2021) and Zawacki-Richter et al. (2015)</td>
</tr>
<tr>
<td><strong>Learning activity preferences</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cognitive use</td>
<td>o [passive use] accessing content/information acquisition/consuming content (e.g., news) o [active use] creating and sharing content.</td>
<td>Özlü and Kalyoncuoglu (2017)</td>
</tr>
<tr>
<td>Knowledge management</td>
<td>o Collecting content/items. o Curating content/items.</td>
<td>Dennen (2019) and Dennen et al. (2020)</td>
</tr>
<tr>
<td>Communication</td>
<td>o Forming study groups, etc. o Sharing collected or curated items online. o Connecting groups of people or networks via knowledge transmission (broker). o Engaging in collaborative and discursive processes in which learners work together to agree upon meaning (negotiate).</td>
<td>Dennen (2019); Dennen et al. (2020) and Dolch et al. (2021)</td>
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(continued)
in learning, and (c) challenges of media usage. First, the research has examined the associations between the use of different or multiple media (e.g., e-learning tools, web 2.0 applications, and/or social media) for specific learning purposes (versus in general) and its positive consequences such as attention, engagement (behavioral, cognitive, and emotional), motivation, creativity, critical thinking, collaboration, interaction, positive learning attitudes, academic performance (knowledge, skills, and GPA), and access to professional communities (Barton et al., 2021; Carpenter & Harvey, 2020; Greenhow et al., 2020). These researchers have argued that learners’ knowledge activities (e.g., exchanging knowledge, discussion, interaction, and networking) are the main mediators in the relationship between media use and positive learning effects (Gulzar et al., 2021). A handful of researchers also specified the relationship between media usage and positive consequences by adding new factors (e.g., facility conditions, performance expectancy, effort expectancy) or rearranging the constructs to find predictors or moderators (Barton et al., 2021; Rahman et al., 2021). By classifying learners’ behaviors, purposes, and consequences, researchers have been capturing the nuances and inferring what could be beneficial to learning from learners’ media usage.

Researchers have further discussed the critical factors influencing media-enhanced learning and learners’ different behavior patterns. Personal factors include digital literacy, social media competencies, perceived usefulness of digital media, and digital media self-efficacy (Pumptow & Brahm, 2020; Zawacki-Richter, 2009). Situational or cultural factors include countries or regional areas that have poor technical infrastructures or a lack of adequate Internet provision. To overcome this

<table>
<thead>
<tr>
<th>Dimensions</th>
<th>Levels or categories of each dimension</th>
<th>References</th>
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<tr>
<td>Constructing knowledge and creating a product that can be shared with other learners.</td>
<td></td>
<td></td>
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<tr>
<td>Learning activity preferences in specific online learning platforms (e.g., MOOCs)</td>
<td></td>
<td></td>
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<tr>
<td>Quantity of activities</td>
<td>o (level) none, low (one or two), medium, high (the majority of resources/activities)</td>
<td>Ferguson &amp; Clow (2015); Kizilcec et al. (2013) and Poellhuber &amp; Bouchoucha (2019)</td>
</tr>
<tr>
<td>Variety of use (activities)</td>
<td>o Reading/watching/browsing/auditing content. o Social activities. o Discussions. o Assessment items (e.g., quizzes, tests).</td>
<td></td>
</tr>
<tr>
<td>Individually chosen timeline for learning</td>
<td>o Engaged at the beginning of the course (e.g., the first and second weeks). o Engaged halfway through the course. o Engaged in the majority of the course’s duration. o Engaged but late.</td>
<td></td>
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</table>
challenge, some countries use mobile or smart devices rather than computers and make online materials or open educational resources (OER) available (Conole, 2014). Relatedly, Breines et al. (2020) have pointed out that research on social media use typologies has predominately been led by scholars who conduct empirical studies in western countries from western imperatives. Breines et al. (2020) highlighted that researchers should focus more attention on developing countries and to the social media nonuse phenomenon. There are also studies targeting specific groups of learners, such as educators and first-generation college students. For example, Deng et al. (2021) identified the constructs shaping first-generation college students’ social media use (social, cognitive, and hedonic) and their academic experiences (academic support, emotional support, and distractions impeding work). Their findings revealed that first-generation students differed from their peers in social media use and perceptions.

Although media technologies hold many promises, learners may not always engage in the best practices. Researchers have also examined the challenges of media use for learning purposes, as well as learners’ inappropriate uses of media and the negative outcomes. For example, challenges in using social media for learning purposes include content quality issues and learning resources at the low level of cognitive demands (Carpenter & Harvey, 2020). The open nature of social or other media can also cause “context collapse” risks (Marwick & Boyd, 2011), such as reaching almost infinite and unintended audiences and the possibility of being misinterpreted by audiences (Carpenter & Harvey, 2020).

Future of Learners’ Media Usage

Future Directions of Research in Learners’ Media Usage

Though the literature on learners’ media usage is growing, learner media usage continues to evolve as technologies progress. More empirical research identifying learners’ usage behaviors in new media and exploring the association among existing and new factors, as reported by a number of researchers, is necessary (Pumptow & Brahm, 2020). Additionally, many extant studies were conducted in higher education or informal learning contexts. There has been a lack of research on educational or knowledge activities occurring within and around social media and their connections to K-12 teaching and learning practices (Greenhow et al., 2020). Research on creating and testing educational programs or other interventions in promoting new media use for learning would be another helpful addition to the current discussion in this area. More research focusing on nondesired media usage behaviors, such as nonuse or the low-level of cognitive activities in media-enhanced learning contexts, and more research targeting developing countries and minority groups of learners should also be conducted.

More importantly, future studies should focus on well-designed media-enhanced learning experiences, grounded in robust media or learning theories. This area represents a current weakness of the field. Only a few studies in the field have
used theories or theoretical frameworks, such as Uses and Gratification (U&G) theory (Katz et al., 1973), the 4C framework (Milligan et al., 2014), the Technology Acceptance Model, or Expectancy-Value theory (Palmgreen & Rayburn, 1985). These theories have been used to explain learners’ media usage. With the understanding of why and how learners use media to facilitate learning, researchers should focus on building empirical evidence for how to design better learning experiences with media.

Another direction for future research is better measurement of media usage through analytic technologies. So far, many researchers have relied solely on self-report to measure quantities and forms of media use. Parry et al. (2021) assessed the alignment between self-reported and log-based measures to test the validity of self-reports using pre-registered meta-analysis. They reported that self-reports on media use did not accurately reflect the logged media use. Their findings are consistent with ongoing criticisms of self-reported measures in human behavior (Kuncel et al., 2005). This raises concerns about the validity of studies on self-reported media use, and researchers should carefully design their measures to address this issue. With modern analytic technologies, researchers can track, analyze, and predict learners’ media usage behaviors at a much finer grain and with much higher precision. For example, recently, Wu (2021) has analyzed Facebook group messages through natural language processing to represent learners’ cognitive engagement and predict academic performance.

**Future of Media Development**

As new forms of media emerge, the field should change to reflect the new learning possibilities that these new media bring. In the past few decades, multimedia technologies have expanded the channels of learning and Internet technologies have widened the borders of learning. Opportunities, contexts, and methods for learning have never been so diverse. Similar to the ways learning has evolved through these developments in media technologies, new technologies will bring impacts, changes, and challenges to learning in the future. Three themes for the near future of the evolution of distance, open, and digital learning are predicted:

First, future digital learning experiences will become increasingly immersive and interactive with the help of extended reality (XR) technologies. XR refers to a collection of media technologies that aim at combining virtual and real environments (e.g., virtual reality, augmented reality, mixed reality). Previous media (e.g., multimedia and Internet technologies) are primarily accessed through a digital device with a screen interface. This setup separates learners from real-world settings and draws them into a virtual world, which has caused many problems, including a lack of social presence. The goal of XR technologies is to bring an immersed learning experience to learners by either simulating real-world settings or merging the virtual world and real world (Kang et al., 2021). With XR, learners may demonstrate more complex media usage behaviors. Additionally, media behavior will no longer only
refer to the usage of one or more specific tools. Instead, it will be immersed with real-world interactions and embedded in authentic settings.

Second, due to the advancement of artificial intelligence technologies, digital learning experiences will be more personalized and adaptive in the future. Although artificial intelligence technologies per se are not necessarily a medium, they constitute an important component of future media by mediating learners and their learning. The research endeavors in this field help to (a) better capture learners’ complex media usage behaviors and their relationships to learning and (b) design and deliver a more personalized learning experience. Matching the most appropriate learning module or support to learners relies on an accurate estimation of students’ cognitive and affective states (Liu et al., 2020). With machine learning and deep learning technologies, learning systems can model and understand the complexities in learner behaviors and then make personalized learning experiences possible.

Third, learning in the future will become even more accessible, connected, and equitable with networked technologies. Networked technologies have been developing at a very high speed over the past two decades. The ubiquity of the media (e.g., Internet of Things) will make learning no longer reliant on one or limited devices or places – it can happen virtually anywhere and anytime. Further, learners worldwide will no longer be isolated in their own local communities. Online communities interconnect with offline communities, and the distance between learners is going to be increasingly closer. This should lead to a more equitable and open future of learning. Technologies like blockchain will further help to break the boundaries between local institutes. For example, learning certificates will be stored distributedly around the world and be able to be recognized by everyone (Gräther et al., 2018). New media and technologies will provide both opportunities and challenges for learners. Researchers should identify the new media usage patterns and guide educators and practitioners to understand learners’ behaviors and needs when designing and facilitating learning with new media in diverse contexts.

**Conclusion**

As a wide range of different media, technologies, and applications have become available to twenty-first-century learners, views on the roles of media and instruction have also shifted. A perspective that once upheld teacher-centered practices and considered media almost solely as a tool for content delivery is now being supplanted by the concept of learning with media as people begin to support learner-initiated practices.

Learners use media for different purposes in diverse learning contexts. Therefore, it is increasingly important to understand learners’ media usage preferences, behaviors, and patterns so that educators, researchers, and other stakeholders can provide appropriate, relevant support. This chapter described the media evolution in open, distance, and digital education and discussed diverse typologies and media usage
behaviors, as well as the current research on learner media usage and future directions for research.

The diversity of typologies and media usage behaviors were identified, due to the different focuses of extant studies, such as the specific media, groups of users, contexts, and/or knowledge-related activities under study. Typologies and media usage patterns have also been developed based on combinations of the selected dimensions or criteria by researchers applying these combinations to their study contexts. The summary of the dimensions provided in this chapter can be useful to gaining insight into the vast amount of different media usage patterns that could be captured in different settings.

Today, media technologies are more prevalent than ever, and as a result, learning should be more accessible than ever. Nevertheless, challenges in learning with media persist. Therefore, understanding learners’ media usage will be instrumental to research seeking to promote learning with the facilitation of media and will provide insights into the design and development of future and better open, distance, and digital education.

References


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