Navigating Online Learning Through "Technological Frames": A Qualitative Examination

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Abstract
This study is part of a larger critical discourse analysis (CDA) that examines technology-enhanced learning environments, such as online learning, e-learning, Web-based learning, computer-assisted learning, computer-mediated learning, and open and distance learning. The goal of this qualitative research was to analyze how educational technology scholars perceive and interpret technology in teaching and learning contexts. Using Carl Mitcham's typology of technological frames, which categorizes technology into four groups: (1) object, (2) knowledge, (3) activity, and (4) volition, we identified the types of technological frames that educational technology scholars use to define learning environments. The content analysis of nine semi-structured interviews showed that scholars primarily associate technology with volition (i.e., individuals' motivations, desires, will, culture, and consent regarding technology), followed by activity (i.e., technology related actions such as designing, drafting, crafting, programming, and analyzing) and object (i.e., tools), while technology as knowledge (i.e., facts, explicit and implicit skills, recipes, rules, beliefs, descriptive laws, principles, and experiences) was the least referenced technological aspect. Additionally, we discovered a new aspect of technology called "space." The findings provide theoretical and practical insights into the literature on technological frames in online and distance learning. Importantly, insights into possible directions for research on online learning in the coming decade are offered.

Keywords: Technological frames, educational technology, Carl Mitcham, qualitative, philosophy of technology

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The landscape of education has undergone significant transformations due to the integration of digital technologies, including artificial intelligence, virtual reality, big data analytics, and other emerging technologies (Burbules et al., 2020; Guan et al., 2020). Nevertheless, the inherent complexity and uncertainty surrounding these technologies, such as the rapid evolution of the digital technologies and their immaterial, abstract functionalities, present challenges when it comes to interpreting and evaluating their impact (Spieth et al., 2021). The field of Educational Technology, which sits at the intersection of technology, learning, design, and communication (Bond et al., 2019) involves continually evolving terminologies to define technology-enhanced learning environments such as online learning, e-learning, Web-based learning, computer-supported learning, computer-assisted learning, virtual learning, and distance learning (Dağhan & Gündüz, 2022; Moore et al., 2011). These concepts are sometimes used interchangeably which, in turn, poses difficulties for researchers to perform meaningful cross-study comparisons (Moore et al., 2011). To better understand the rapidly changing digitization of higher education, we need to ask critical and skeptical questions about "the social, cultural, political and economic connotations of digital technology use in higher education" (Castañeda & Selwyn, 2018, p .1).

Therefore, exploring *technological frames* becomes crucial, as they capture the assumptions, expectations, and knowledge that individuals employ to comprehend the application and consequences of technology within specific contexts (Kaplan & Tripsas, 2008). Technological frames, also known as "cognitive lens," "mental models," "reference points," "interpretive schemata," "scripts," and "cognitive maps," examine how people assign meaning to technology (Orlikowski & Gash, 1994).

Recognizing that successful online learning demands more than mere access, the integration of intentional and supportive instructional designs becomes paramount (Redmond et al., 2018). For example, the strategic utilization of digital technologies such as learning management systems, discussion boards, wikis, blogs, social networks, and annotation tools can significantly enhance student collaboration, as long as they are chosen to align with the intended learning objectives rather than emphasizing tool usage alone (Oyarzun & Martin, 2023).

Studying individuals' technological frames provides valuable insights for understanding the intricate relationship between scholars and digital technologies, particularly in the realm of technology-enhanced learning environments (Basdogan et al., 2022). For example, in a case study conducted within a faculty professional development context in the US, researchers analyzed faculty members' technological frames to uncover the elements that filter, shape, and limit faculty perceptions and behaviors towards technology (Basdogan et al., 2022). The findings indicated that most faculty members viewed and described technology as tangible objects (90.6%) such as tools, devices, computers, and Web 2.0 apps. They also perceived technology as volitional (78.1%) and encompassing normative judgments related to its use, such as efficiency, role in enhancing life, and capacity to achieve goals. These results suggested that the heterogeneity of technological frames provides a balanced and comprehensive understanding and implementation of active learning technologies in online and face-to-face classes (Basdogan et al., 2022).

In addition, technological frames set boundaries in which individuals perceive and use technology within a social group (Olesen, 2014). For instance, in a longitudinal study conducted over a 10-year period, Olesen (2014) examined *technology-in-use* frames and *technology-strategy* frames of teaching faculty, senior managers, and staff. The author argued that addressing ingrained technological frames in an organization, such as reliability and availability of a technology, can be complex and that the frames held by dominant groups are difficult to change, even with ample communication and targeted training programs (Olesen, 2014).

On the other hand, Davidson (2002) argued that the interpretation of technologies can evolve over time as individuals engage with them in a specific context rather than being predetermined by specific features of technology. Hence, people, including those with similar experiences or resources, might form distinct expectations and beliefs about technologies, leading to diverse interpretation of technology (Treem et al., 2015).

Finally, understanding how people perceive technology is vital as "technological frames structure experience, allow interpretation of ambiguous situations, reduce uncertainty in situations of complexity and change, and provide a basis for taking action" (Lin & Silva, 2005, p. 50).

In this interpretive phenomenological study, we analyzed educational technology scholars' technological frames to better understand how they perceive and interpret technology in various teaching and learning contexts. We have chosen educational technology scholars as participants for the following reasons: (1) they are specialists in technology-enhanced learning, albeit aligned with a variety of concepts such as online learning, e-learning, Web-based learning, computer-assisted learning, computer-mediated learning, and open and distance learning, (2) they have active research agendas that are influenced by the current changes in educational technology, and (3) they stand at the intersection of education and technology, allowing for a multidisciplinary technological frame analysis. We will introduce the technological frame analysis in the upcoming section and outline its application in the empirical research.

Review of Literature

Technological Frame Analysis

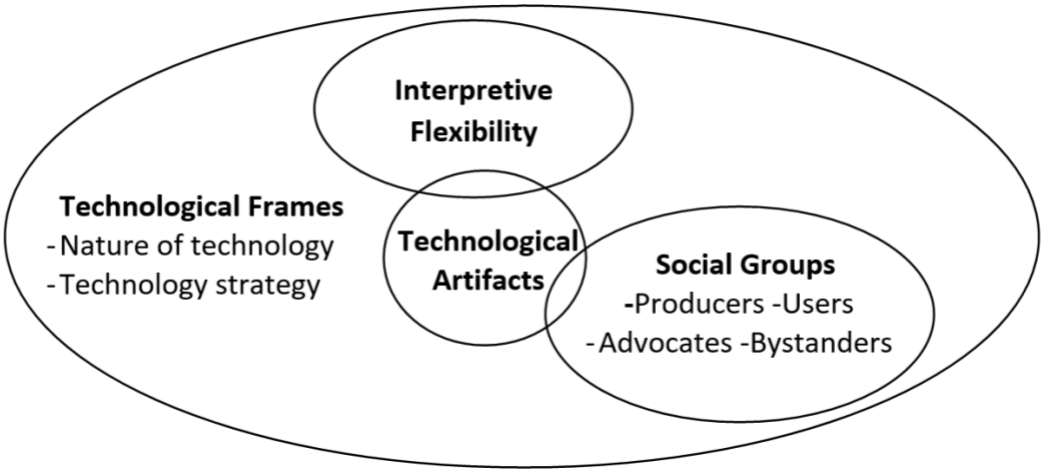
As a concept, technology is difficult to define due to its dynamic nature, which continuously adapts and expands in response to societal, cultural, aesthetic, and scientific advancements (Carroll, 2017). Olsen and Engen (2007, p. 457) point to this complexity in the following definition:

> The term "technology" is a slippery one. The common perception is that technology is machines, devices, and tools used for some purpose. Technology is also understood as artefacts. The Concise Oxford Dictionary defines technology as the "science of practical or industrial arts; ethnological studies of the development of such arts; application of science." Here, technology is understood as knowledge. However, this definition misses the hardware aspect that is the commonly held perception of technology in everyday language. Maybe the most common way of defining technology is to integrate artefacts and knowledge, for example "artefacts and knowledge about their operations." But these definitions are missing the context in which all technologies exist.

The Social Construction of Technology (SCOT) concept developed by Pinch and Bijker (1984) addresses the missing piece: the social context of technology (Olsen & Engen, 2007). Researchers rooted in the technological determinism tradition view society and technology as distinct domains where technology evolves independently and influences and directs societal development. Influence, according to this view, does not flow in the opposite direction, from society to technology (Elle et al., 2010). In contrast, SCOT argues that human actions shape technology (Prell, 2009). SCOT consists of three interactive components: (1) interpretive flexibility, (2) social groups, and (3) technological frames as presented in Figure 1 (Bijker, 1995).

Figure 1

Three Interactive Components of SCOT, Adopted from Bijker (1995)



According to SCOT, technological developments and innovations are a result of social interactions among various individuals in relevant social groups (Bijker, 1995). Within these groups, meanings attached to technological artifacts are culturally constructed. In effect, this refers to the interpretive flexibility component of the model (Elle et al., 2010). Finally, technological frames include all elements that influence activities in social groups and flexible interpretations attributed to technological artifacts (Orlikowski & Gash, 1994). "These elements include goals, key problems, problem-solving strategies (heuristics), requirements to be met by problem solutions, current theories, tacit knowledge, testing procedures, and design methods and criteria" (Bijker, 1995, p. 123).

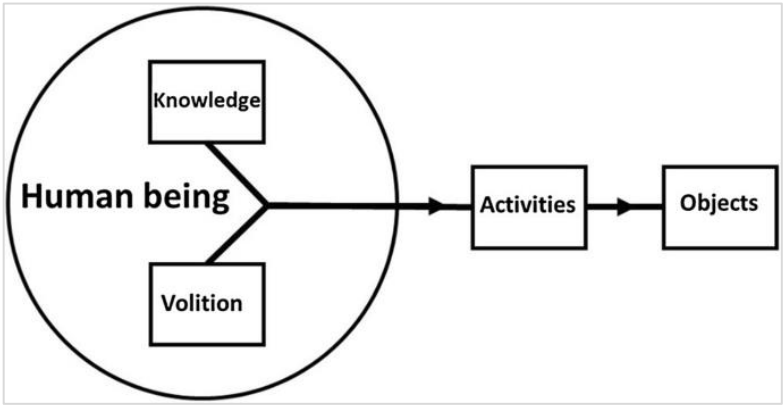
As an analysis technique, nearly three decades ago, Orlikowski and Gash (1994) first introduced technological frame analysis, which involves examining the assumptions, interpretations, and expectations that individuals hold about technology. Technological frames can be seen as perceptual lenses through which we filter and interpret the actions of others and our surroundings, enabling us to make sense of the ever-evolving technologies. This analytical approach is rooted in the social cognitive philosophy and organization change (Davidson, 2006). A technological frame deals with:

> … the assumptions, expectations, and knowledge they [the subset of members] use to understand technology in organizations. This includes not only the nature and role of the technology itself, but the specific conditions, applications, and consequences of that technology in particular contexts. (Orlikowski & Gash, 1994, p. 178)

In their foundational work, Orlikowski and Gash (1994) identified several key themes related to technology. These themes encompassed the "nature of technology," including its capabilities and functionality, the "technology strategy," referring to strategic considerations behind its utilization, such as motivations and visions, and "technology in use," the tangible outcomes resulting from its implementation and usage. This analytical technique has been referenced in a wide array of published literature including health care (Frennert et al., 2020; Huvila et al., 2021), business (Abdelnour-Nocera & Sharp, 2012; Davidson, 2006; Mengesha, 2010; Olesen, 2014; Treem et al., 2013), and computer science (Sedlack & Tejay, 2011). For example, Huvila et al. (2021) studied how patient accessible electronic health records (PAEHR) technology was framed by different age groups in Sweden. Results showed a variety of frames in young and older participants concerning the benefits of technology (technology-in-use) and how to improve the technology (technology strategy). In addition, Treem et al. (2013) examined how social media was perceived in a workplace in the US. Their findings suggested that younger individuals and frequent social media users outside of work had skeptical technological frames, while older workers and those less experienced with social media were optimistic about the potential benefits of social media. These studies emphasized the socially constructed nature of technology and how users perceive technology within various contexts depending on their age, educational background, and previous experience with specific technology.

Similarly, Carl Mitcham (1994) presented another viewpoint on technological frames called Manifestations of Technology Typology (Figure 2). In *"Thinking Through Technology*, Mitcham (1994) proposed that technology can be comprehended in its broadest sense by considering four distinct aspects: (1) technology as an object, (2) technology as knowledge, (3) technology as activity, and (4) technology as volition. According to this framework, technology manifests itself in diverse ways, and individuals' perceptions and experiences of each aspect may vary depending on their individual and social interactions.

Figure 2
Mitcham's Manifestations of Technology Typology



In this model, the *object* aspect encompasses both dynamic and static tools and devices, while the *knowledge* aspect encompasses theories, rules, terminologies, laws, and recipes. The *activity* aspect encompasses the various actions performed using or facilitated by technology, including design, development, motivation, analysis, and more. Finally, the *volition* aspect addresses ethical and moral considerations surrounding the utilization of technology.

Previous literature suggests that technology frames matter and that there are limited frame analyses in the technology-enhanced learning domain (Spieth et al., 2021). Utilizing Orlikowski and Gash's frame analysis as a foundation (1994) in this research, we investigated the meanings that educational technology scholars attributed to technology-enhanced learning environments. The following primary research question guided our inquiry: How do educational technology scholars who specialized in various technology-enhanced learning concepts such as online learning, e-learning, Web-based learning, computer-assisted learning, computer-mediated learning, and open and distance learning perceive and interpret technology?

Method

We employed Interpretive Phenomenological Analysis (IPA) as a research method to explore the meanings that educational technology scholars attach to technology-enhanced learning concepts, such as Web-based learning, E-learning, Computer-aided learning, Distance learning, Open learning, Online learning, and Computer-assisted learning. IPA is a qualitative research approach that focuses on understanding how individuals make sense of and derive meaning from their personal experiences (Emery & Anderman, 2020). In this context, the concept of meaning is regarded as fluid and constantly open to fresh insights, modifications, interpretations, and reinterpretations (Creswell, 1994). By applying IPA, we aimed to capture the nuanced perspectives and interpretations of the participants regarding the technology-enhanced learning environments.

To ensure the study's relevance and personal significance to the participants, a purposive sampling technique was employed (Noon, 2018) by inviting participants to provide rich first-person accounts of their experiences with the identified concepts (Smith et al., 2009). This approach enabled the investigation to capture detailed information from a specific group of individuals who have experienced the phenomenon of interest, as described in the following section.

Data Collection

This study is a part of a larger critical discourse analysis (CDA) study. In the first step, we analyzed 191 doctoral dissertations written about various technology-enhanced learning environments in Turkey within the educational technology domain. Our purpose was to understand how these terminologies have been conceptualized theoretically and studied methodologically in academia by educational technology scholars hoping to promote sustainable terminology use in the educational technology field. These dissertations were retrieved from the thesis database of the Turkish Council of Higher Education. The following keywords have been searched separately: "Computer-Aided Learning/Education," "Computer Assisted Learning/Education," "Computer Supported Learning/Education," "Distance Learning/Education," "E-learning," "Online Learning/Education," "Open Learning/Education," "Virtual Learning/Education," and "Web-based Learning/Education." The rationale behind the

inclusion of these keywords is rooted in the lead author's familiarity with these terms, gained through her academic research endeavors and practical roles, including positions as online learning designer, distance education coordinator, and e-learning designer. In addition, the second author has more than three decades of experience in online and distance education research and teaching which served to help validate the keyword selections.

In the current study, we invited the authors of those dissertations analyzed in the initial step (i.e., the CDA) for interviews. We conducted an online search for publicly available email addresses of the 191 dissertation authors and identified 68 individuals with valid addresses. Subsequently, invitations were sent to these addresses, resulting in 18 unsuccessful deliveries and 50 successful ones. At the end of two rounds of invitations via e-mails, nine individuals agreed to be interviewed.

Table 1 presents the pseudonyms for nine participants by their conceptual field as indicated in their dissertations and interview durations.

Table 1

Pseudonyms for the Interviewees and the Conceptual Categories of Their Dissertations

Pseudonyms	Conceptual Category	Interview Duration
Didem	Web-based learning	52m 53s
Halide	E-learning	59m 58s
Nilgün	Computer-aided learning	46m 7s
Tomris	Distance learning	1h 2m39s
Yaşar	Distance learning	1h 9m 18s
Nazım	Open learning	1h 12m 54s
Tarık	Open learning	1h 56s
Aziz	Online learning	58m 58s
Orhan	Computer-assisted learning	58m 39s

We used Zoom as the interview platform and the recorded interviews lasted about 45- 75 minutes. The interview protocol consisted of semi-structured questions, starting with “Can you please tell us about yourself and your study area?” The rest of the semi-structured questions were formulated based on the initial round of discourse analysis findings, incorporating emerging categories that pertain to the definitions of "space," "time," "agent," "power," and "level of operation" within each conceptual category (See Appendix A for the interview questions). For transcription, an online transcription software (i.e., Sonix) was used. To reach 100% accuracy, the first author listened to each audio file and manually fixed the errors in the automated transcription. After completing the transcription, we sent the files back to interviewees to get their approval for accuracy and to ask them if they want to add or remove anything. Two scholars (i.e., Orhan and Halide) revised and edited several parts of the interviews for precision.

Participants

The "Participants" section refers to the nine educational technology scholars who attended the interviews. Notably, in this interpretive phenomenological study, participant demographics, such as age, gender, or race, did not substantively contribute to our research questions to understand the relations among human beings (i.e., scholars who studied educational technology concepts) and technological artifacts (Frechette et al., 2020). Since we were

interested in educational technology scholars' understanding of technology in the sense a philosophy "from" technology (Ihde, 2009), we associated the notion of the "demographics" of the study with the participants "conceptual interests" and "professional background." To better describe the study context, the following section presents nine participants' authentic life-story narratives. Each story title is a representation of the theme from a portion of their interview.

Didem's Story: Web-based learning as an Extension of the Human Body

Didem is a faculty member in the Special Education Department at a university in central Anatolia. She is interested in the use of educational technology in the special education field. In particular, she seeks a professional specialty and visible outcomes of the technology in the lives of people who need it. She explained her professional interest as follows:

> With my doctoral dissertation, I started to shift a little to special education. I had an interest in special education because I had already worked and [was] experienced with the visually impaired students for my doctoral dissertation study, so I had the chance to see how well my field worked. Sometimes when I was studying in my department, I felt aimless. I thought, you know, there is no core knowledge in the educational technology field, and there is a time when I have been lost in thoughts like, "am I in a department that is not useful to others?" In those thoughts, I then started working in the field of special education and I said "ok." So, you can really get what you do, and it is a field that's directly related to technology. Therefore, special education is now my second research interest. My interests are the use of technology, especially in the visually impaired students. Because technology [Web-based learning] is the only thing that can compensate for their eyesight. It can equate these people to the individuals who can see.

Nilgün's Story: Computer-aided Learning as an Extension of Human Cognition

Nilgün is a research assistant in the Information Systems Engineering Department in a private university located in central Anatolia.

> In my doctoral dissertation, I wanted to develop an application to work especially with people with disabilities. Because I have a disabled brother. My 19-year-old brother has intellectual disabilities. I went to a vocational high school and studied computer science. Since then, I have wanted to develop apps to support my brother's education. While doing my Ph.D., I also took courses in special education so that I could get to know this field. In order to develop an application, I had to understand what they needed and what kind of content I needed to develop, so I took some courses from Gazi University special education department. I started this process and wrote my dissertation to create an exemplary study in this field.

Halide's Story: An Instructional Designer's E-learning Dilemma: Coffee or Tea

Halide is an instructional designer in a distance education center of a university located in central Anatolia.

> Since 2007, I have been officially working as an instructional designer at the distance education center of a public university in Turkey. I still work there. My studies, doctoral

> dissertation and master's thesis are all in the field of e-learning. I am not just a lecturer in college. I have a role to play in developing instructional content. So, I am both a practitioner and an academic lecturer. Sometimes what I write or want to happen in my academic articles cannot happen in practice [We're laughing]. Theory and practice do not always match. This, of course, is because of cultural differences, lack of infrastructure, etc. I am recently very focused on video design. The design of video content. I am interested in cognitive processes.

Tomris's Story: Distance Education in the Time of Capitalism

Tomris taught philosophy to high school students for a long time in Turkey and then completed her doctoral degree in the adult education department. In her dissertation research, she critically analyzed the economic politics of the distance education centers in Turkey.

> My bachelor's degree is in philosophy. After I finished my master's degree, I started the doctoral program because of my academic advisor's insistence. [We're laughing] I have studied women's education in my master's dissertation. At the time, I scanned news columns, it was discourse analysis research [project]. Then, when we encountered very important things about distance education in recent years, we wanted to discuss critically what distance education centers serve, what they are interested in, or how the meaning of university education is changing due to these distance education centers.

Aziz's Story: Eternal Sunshine of the New Possibilities in Online Learning

Aziz is an associate professor in one of the high-ranking central Anatolia universities.

> I was more concerned with how a tool might be used effectively in [sic] education rather than its technical features. I am always interested in online learning. Since 2007, I have worked on various subtopics of online learning. For example, in my master's thesis, we looked at the relationship between learning preferences and learning style. Then it was suggested that learning style was a myth. Then I started my doctoral program. The concept of "sustainability" was popular at that time. I was always against those who defend "diffusion of innovation." I think the adoption of educational technology within a community should be different from the adoption of an anchor in the agricultural context among villagers. I think individual internalization process should be prioritized in the educational context.

Orhan's Story: The Imperfect Union

Orhan is a lecturer in the Department of Computer Education and Instructional Technologies at a large public university located in western Anatolia.

> After I graduated, I started working as a computer education teacher in public schools. Meanwhile, in 2010, I started my master's degree at the same university and in the same department. Three years later, I started my doctoral program and got my degree in 2018. I was interested in computer-assisted training. But since we have been trapped in distance education lately, I am trying to research something related to distance education situations.

> I am also interested in cyber psychology. It was this topic that usually appeared in [prestigious] journals like *Applied Psychology*, which I saw there, and I was intrigued. Since my advisor studied similar subjects, he gave me approval and we designed something. So, by computer-assisted environment, we mean *animations*. We explored the disfluency effect, the question of what contributes to upper cognitive decisions and successes.

Nazım's Story: Human Landscapes from Open Learning

Nazım is a Communications faculty member at a non-profit private university in Istanbul.

> I teach about television, camera, light, sound, studio techniques, and film production. I am also supervising graduation projects. I am one of those who witnessed and [was] actively involved in the process while the foundation of today's distance education system in Turkey was established. At that time [in the early 80s] a commission was formed to plan distance education. No one could even define education in that 15-member commission that I was involved in. It was natural. The unnatural part was the fact that all members were from fields such finance, business, and accounting but education.... When this commission first asked, "what do we do, how are we going to do?" no one had an answer. I took the floor and said, "First, we need to decide what is the ideal citizen we want to have in this school then we will decide the courses and content that will help us gain the values of this ideal citizen."

Tarık's Story: Black Mirror-Bandersnatch

Tarık is a professor in a distance education department in a large public university located in west Anatolia.

> When I look at my professional history and background, I can say that I have around 25 years of experience. I keep conducting research as well as teaching in open and distance learning faculty.
>
> Both our curiosity and important reports such as the "Horizon Report" or "World Economic Forum" guide our research. The new concepts that we learn from these reports. Because, you know, there is no age limit to learning. I am recently working more on the technology dimension and interaction. Artificial intelligence, artificial intelligence ethics, free will, choice, [and] prediction systems for the student to be successful. But if you look at my work lately, I have also been researching about inner and external motivation of adult learners. Gamification is one of them.

Yaşar's Story: Distance Learning Without Motivation: Birds Without Wings

Yasar is a researcher in a large public university located in western Anatolia.

> I have been working in the field of open and distance learning since 2010. My background is English language education. However, after working in the field for 5-6 years, I got very interested in online learning environments. I completed my master's degree in 2012. Then, I received my doctoral degree in 2016 in the distance education department. I studied motivation design in my doctoral research. Especially in the groups

> I taught, the lack of motivation was one of the biggest challenges. Motivation, engagement, and procrastination are my research interests.

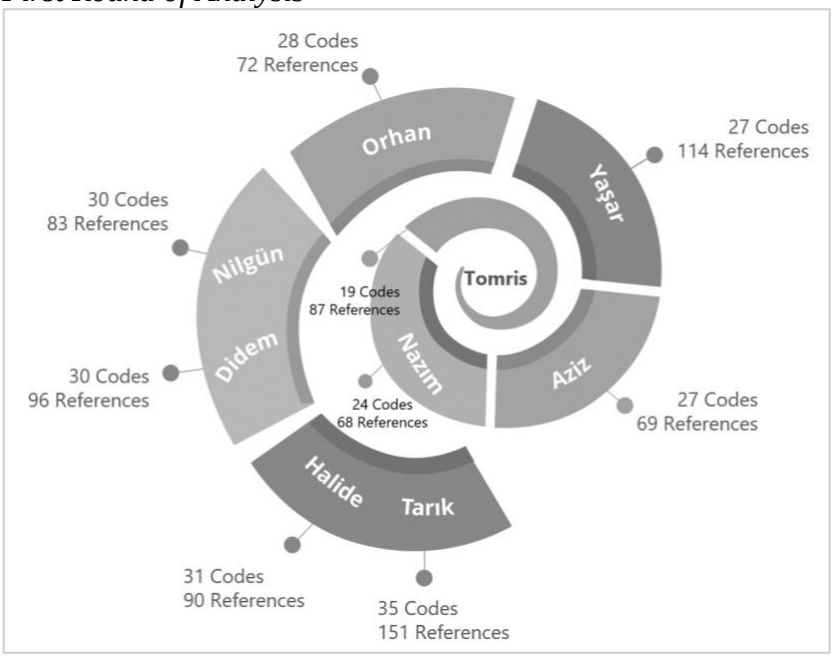
Data Analysis

Content analysis technique, which is an objective, systematic, and numerical description of the text (Weber, 1990), was preferred to make valid inferences from the interviews with scholars who researched technology-enhanced learning environments. In this analysis, codes—the smallest units of text—included words, phrases, sentences, and paragraphs. The initial codebook was drafted using Carl Mitcham's four elements of technology framework. In this codebook, the main codes were identified as: (1) Object, (2) Knowledge, (3) Activity, and (4) Volition.

The subcodes, on the other hand, were extracted from each interview text. This iterative process of coding is called "Snowball Coding" (Basdogan, 2021). In this coding technique, each interview was analyzed based on the cumulative codes of the previous interviews. Figure 3 presents the flow of the Snowball Coding technique and the number of codes and references emerged in the first round.

Figure 3

The Number of Codes Emerged in Each Interview and the Number of References Used in the First Round of Analysis



In the second step, the replicating codes were combined. Next, a comparison of the final code list was conducted with the second coder's analysis. The second coder analyzed randomly selected interview data (i.e., around 30% of the entire text) individually. Table 2 presents the numerical elements of this content analysis and final codes.

Table 2
Overview of Interview Coding Process

Content Analysis Elements	Count
# Interviews coded	9
# Analyzed lines	4,650
# Final codes in NVivo	92
# References in NVivo	830
# Coding rounds	2
# Coders	2

The list of the codes under the four main categories Object, Knowledge, Activity, and Volition is presented in Figure 4.

Figure 4
The NVivo Screenshots of the Emerging Coding Frame

Categories			
Activity	**Volition**	**Objects**	**Knowledge**
Motivating	Non-institutionalized	Camera	Theories
Updating the course	Choice	Blogs	Design
Monitoring	Sustainability	YouTube channel	Accessibility
Providing variety	Empathy	Multiple mediums	Target audience
Involving students	Sense of security	Discussion boards	Instruction
Updating	Dedication	Vyond	Evaluation and Assessment
Feedback	Political economy	Articulate	General literacy
Building connection	Intention	Internet browser	Reliable date
Mentoring	Unintentional consequences	Prezi	Empirical studies
Learning	Ethics	Smart book	Digital literacy
Practicing	Institutionalized power	Kahoot	Models
Preparing	Value	Computer	Processes
Communicating	Aesthetics	Webpages	Readiness
Method	Human desire to learn	Screen sharing tools	Motivation
Interacting with		Camtasia	

Findings

It is found that *volition*, representing individuals' attitudes, intentions, self-realizations, and normative judgments to use a technology was identified as most prevalent (39.0%). Volition was followed by activity (i.e., actions such as designing, creating, using, developing, and evaluating) (21.4%) and object (i.e., static and dynamic items such as printed books, TV, radio, internet, computers, mobile phones, e-text, or drones) (21.2%). The perception of technology as *knowledge* (i.e., theories, models, frameworks, skill sets, descriptive laws, recipes, and empirical

findings) was the least referenced (18.4%) manifestations of the technology in the coded data. Table 3 details the manifestations of the technology categories.

Table 3

The Frequency and Percentage of the Technology Categories

Technological Frames	Occurrence
Object	84 21.2%
Activity	85 21.4%
Knowledge	73 18.4%
Volition	155 39.0%
Total:	397 100.0%

Volition

In the volition category, 155 codes emerged, and it was identified that Tomris, who studied the current state of the distance education centers in Turkey from a critical perspective, used the most volitional references (n = 31) in describing technology. Tomris was followed by Tarik (n = 30), Yasar (n = 20), Aziz (n = 16), Halide (n = 15), Nilgun (n = 15), Nazim (n = 12), Didem (n = 8), and Orhan (n = 8) (see Figure 5).

Figure 5

Number of Codes by Interviewee in the Volition Category (i.e., NVivo output)

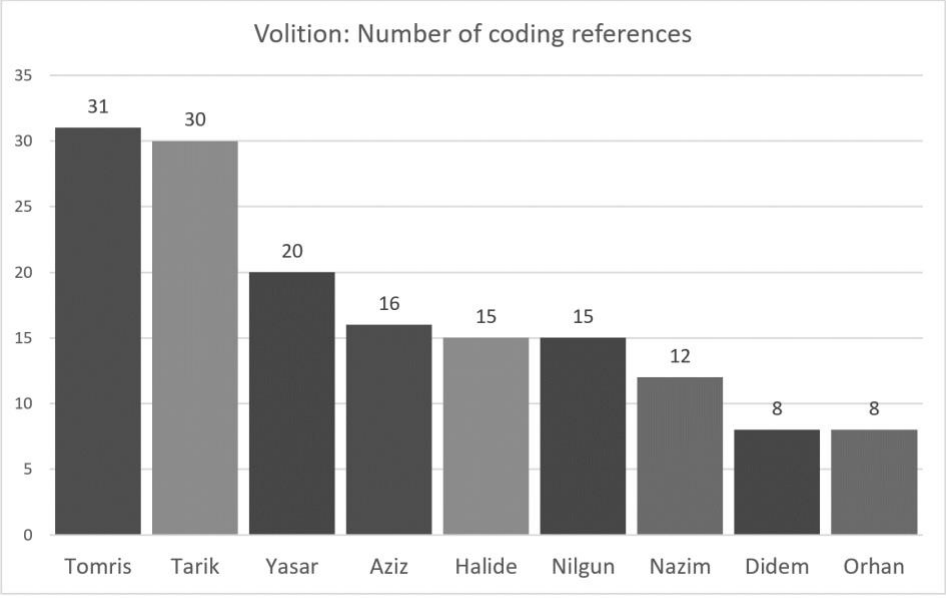


Table 4 presents the sub-categories of the volition category. *Value* is the most frequently identified (n = 84) element among these sub-categories. In this analysis, value refers to

participants' normative claims that evaluate and describe an action or situation as good, bad, desirable, positive, negative, or acceptable.

Table 4
The Frequency of the Sub-categories in Volition

Volition	Frequency
Value	84
Institutional power	12
Ethics	11
Human desire to learn	11
Intention	10
Political economy	8
Aesthetics	5
Unintentional consequences	4
Dedication	3
Choice	2
Empathy	2
Feeling of security	1
Noninstitutionalized	1
Sustainability	1
Total:	**155**

Tomris, Yasar, and Tarik were found to be using more value related volitional statements. For example, Tomris stated that an ideal director who runs a distance education center should not be someone with an engineering background. Similarly, Tarik argued that in open and distance learning technology is necessary condition but not sufficient. "The instructor **must know the LMS very well**. If he does not know it, he will not be able to use LMS's features" [Emphasis added] [Appendix H, Line 184-189]. Another example is Nazim's normative options regarding the qualifications of a faculty member who teaches in on online setting:

> Every faculty **must be a good instructional designer**. When necessary, they should know how to ask for help to use the possibilities of technology to use in the online class. The bottom line is that online education is a serious business, and **it should get the seriousness** it deserves from the faculty. [Emphasis added] [Appendix G, Line 315-318]

Institutional power is the second most frequently identified (n = 12) element in the volition category. This sub-category refers to participants' "we claims" that point to collective identity in which the volition emerges through institutional positioning. For example, as explaining the history of Anadolu Open University, Nazim claimed that "first, **we** need to decide what kind of citizens we need. Then we will decide which courses and learning objectives can be used to reach this goal in this open university" [Emphasis added] [Appendix G, Line 17-21]. Similarly, in response to the question about the instructor roles in the open learning, Tarik argued

"…**we** have lowered learners' feeling of isolation in online settings" [Emphasis added] [Appendix H, Line 213-214].

The next sub-category, e*thics*, included interviewee's moral principles to use a specific technological tool, activity, or knowledge in the learning environments. For example, Aziz who studied sustainability in online learning stated, "Honestly, I do not want my lecture video recordings to be shared outside the classroom. I do not know; it makes me nervous" [Appendix E, Line 561-562]. Yasar, further described his digital ethics related concerns in the following excerpt: "It is more difficult to prevent unethical behaviors of the students in remote learning environments" [Appendix I, Line 610-611].

The *human desire to learn* sub-category refers to individuals' inner needs and readiness to use a specific technological object, knowledge, or method in teaching and learning situations. For example, Aziz emphasized the importance of the learners' internal motivations to use educational technology.

The next identified sub-category under the volition aspect of technology is *intention.* This term refers to interviewee's statements related with the role of the individual goals and objectives to use an educational technology. For example, Nilgun stated that her personal goals to help her brother with an intellectual disability shaped her research interest in the computer-aided learning field:

Political economy is a sub-category that was identified only in Tomris's interview. This term refers to money-driven volition to adopt a specific technology. In her dissertation, Tomris studied the economic and political roles of the distance education centers and continuous education centers in Turkey. Using a critical lens, she observed that:

> The goal of these centers is to generate income for the university. The people I spoke to, the very honest ones, were more openly saying, "yes, we set up distance education centers to make money, of course, it really brings in a lot of revenue." [Appendix D, Line 394-399]

She also argued that these distance education centers resulted in *degree inflation* which is the devaluation of educational or academic credentials over time.

> But increasingly, degree inflation emerged. At this point, it is not enough for people to graduate from one university. In this competitive market you have to get a master's degree. That is not enough. You are going to get a Ph.D. That is not enough, you have to have many program completions certificates. You must speak more foreign languages. Continuous qualification, qualification, qualification. It is indeed a diploma inflation. [Appendix D, Line 139-147]

> Although it seems that the purpose of these distance education centers is to train people under the concept of lifelong learning, in fact their main purpose is to train cheap human labor for the market. [Appendix D, Line 166-172]

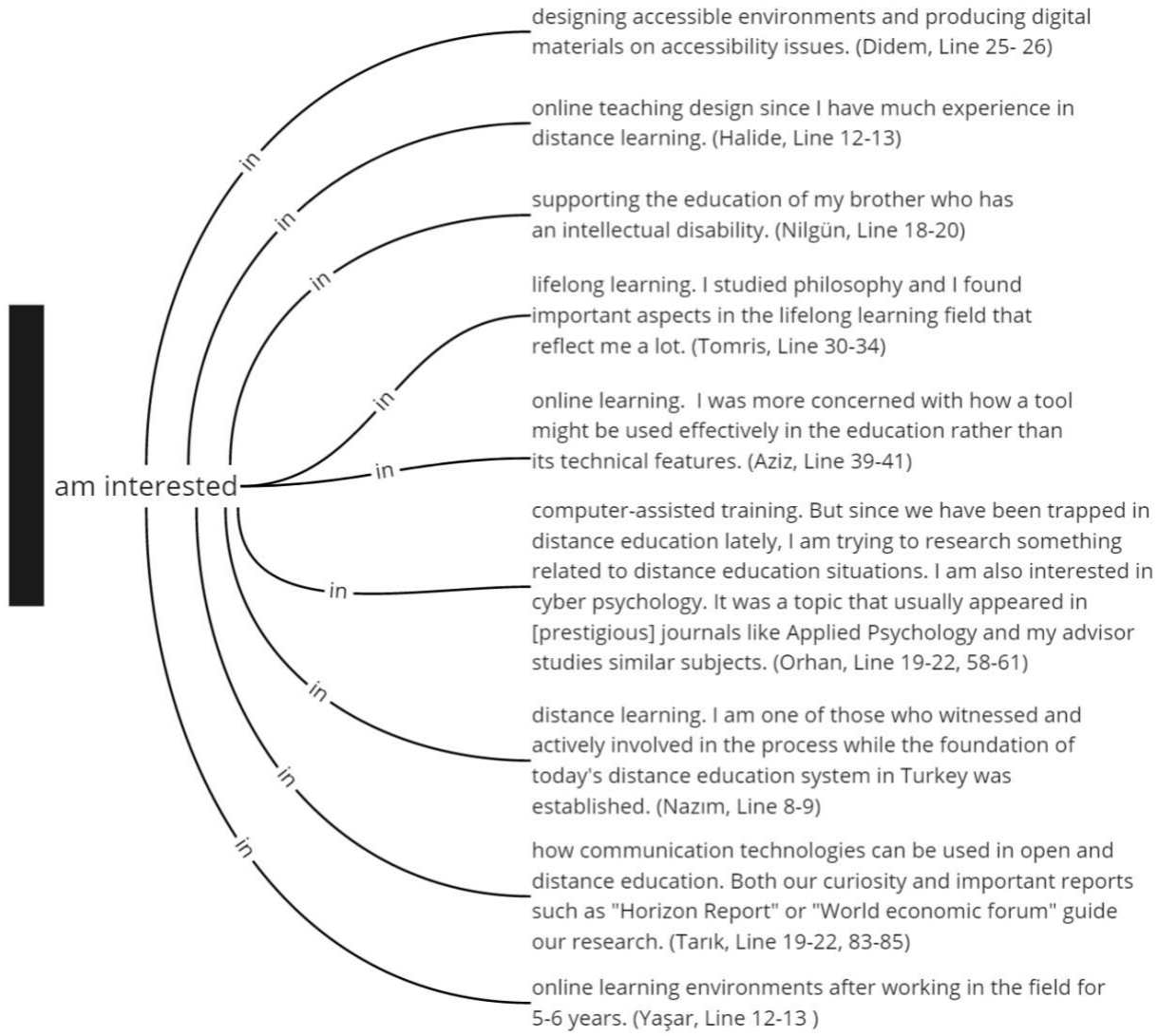
The *aesthetics* category refers to the factors related to the artistic taste and beauty of an educational technology. For example, creativity [Appendix E, Line 254] and instructor' ability to act/perform during online teaching [Appendix B, Line 185] and being energetic [Appendix G, Line 528] are some of the argued aesthetic features of an instructor teaching online found in the volition category.

A "Mental Grasp" of Professional Identity

Participants' emphasis on volition was also identified in their professional identity claims. Figure 6 presents nine interview participants' research interests in the areas related to the educational technology fields. As noted, there is variety among interviewees' motivations and intentions to pursue research on a specific topic. We categorized their interest claims into four main categories: (1) sense of duty, (2) theoretical preferences, (3) curiosity, (4) familiarity, and (5) career achievement.

Figure 6

Participants' "I Claims" on Their Research Interests



First, the *sense of duty* refers to researcher's stimulus to carry out studies that will have a direct impact on people's lives. For example, designing accessible learning environments for students who have visual disabilities [Didem, Line 25-26], supporting her brother's education who has an intellectual disability [Nilgün, Line 18-20] and being among the leading group of people who founded the distance education in Turkey [Nazım, Line 8-9] are some examples extracted from the participants' "I claims."

The second theme, *theoretical preferences*, describes the researcher's tendency to favor certain theoretical paradigms over others. For example, in his statement, "I was more concerned with how a tool might be used in education rather than its features and capabilities" [Line, 39-41], Aziz takes a position against the Diffusion of Innovation Theory and adds that he cares about the contributions of a technology to the field of education rather than it spread and adoption rate. Next, the *curiosity* theme refers to researcher's interest to gain a deeper understanding of a phenomenon. The *familiarity* theme, on the other hand, describes a close acquaintance with the subject matter due to the long years of work experience [Halide, Line 12-13] and teaching experience [Yaşar, Line 12-13].

Finally, items coded in the *career achievement* theme pointed to achievement-oriented motivation. In one case, Orhan stated that he studied computer-assisted learning; however, he recently conducted research on distance learning due to the pandemic. Among the factors for the change in research interests was that the subject appeared in prestigious journals and his advisor's research expertise was in distance learning [Lines 19-22, 58-61].

Activity

In the activity category, 85 codes emerged. As detailed in Table 5, *interacting with peers, materials, and instructor* was the most prevalent (n = 20) sub-category in the activity dimension of technology. It was followed by *giving and receiving feedback* (n = 12), *communicating* (n = 11), *methodizing* (n = 9), *mentoring* (n = 8), *building connection* (n = 5), *practicing* (n = 5), i*nvolving students* (n = 3), *providing variety* (n = 3), *updating the course* (n = 2), *monitoring* (n = 2), *preparing* (n = 2), *learning* (n = 1), and *motivating* (n = 1).

Table 5

The Frequency of the Sub-categories in the Activity Category

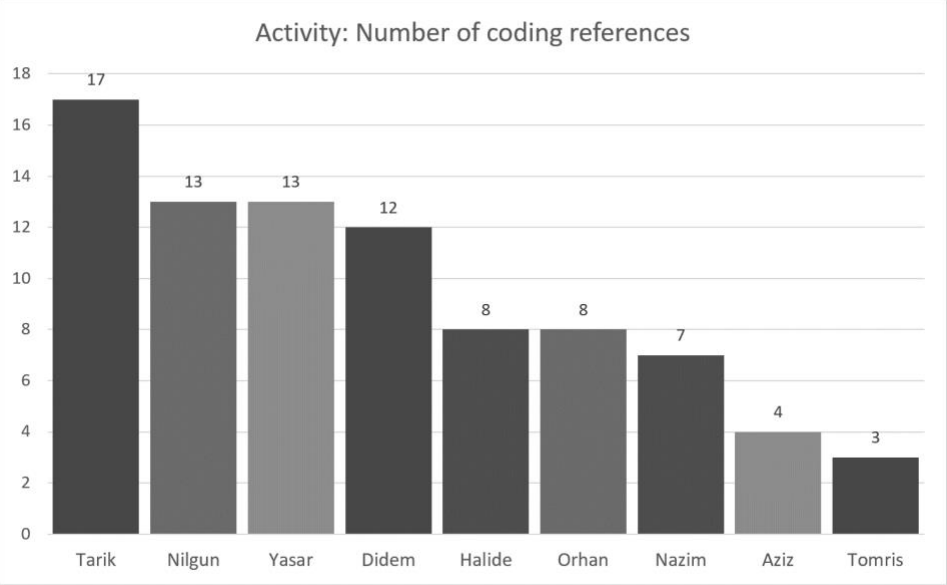
Activity	Frequency
Interacting with	20
Giving-receiving feedback	12
Communicating	11
Methodizing	9
Mentoring	8
Building connection	5
Practicing	5
Involving students	3
Providing variety	3
Updating the course	3
Monitoring	2

Preparing	2
Learning	1
Motivating	1
Total:	**85**

In terms of people, Figure 8 illustrates that Tarik, who studied interaction in the open and distance education, seemed to be using more activity related conceptions such as communicating, interacting, learning, methodizing, practicing, and preparing.

Figure 7

Number of Codes by Interviewee in the Volition Category (i.e., Nvivo Output)



Object

In the object category, 84 sub-categories emerged. Not too surprisingly, Learning Management Systems (LMS) was found to be the most frequently (n = 11) referenced object (Table 6). It was followed by Web 2.0 tools (n = 8), technical infrastructure (n = 7), videos (n = 6), learning resources (n = 5), WhatsApp (n = 5), interactive videos (n = 4), Zoom (n = 3), animation (n = 2), computer (n = 2), Internet browser (n = 2), Kahoot (n = 2), multiple mediums (n = 2), screen sharing tools (n = 2), Television (n = 2), a webpage for feedback (n = 1), Articulate (n = 1), blogs (n = 1), camera (n = 1), Camtasia (n = 1), chat rooms (n = 1), communication technologies (n = 1), concept maps (n = 1), discussion boards (n = 1), forums (n = 1), instruments (n = 1), learning content (n = 1), PPT presentations (n = 1), Prezi (n = 1), screen recorder (n = 1), Second Life (n = 1), smart book (n = 1), Turnitin (n = 1), Vyond (n = 1), and YouTube channel (n = 1).

Table 6

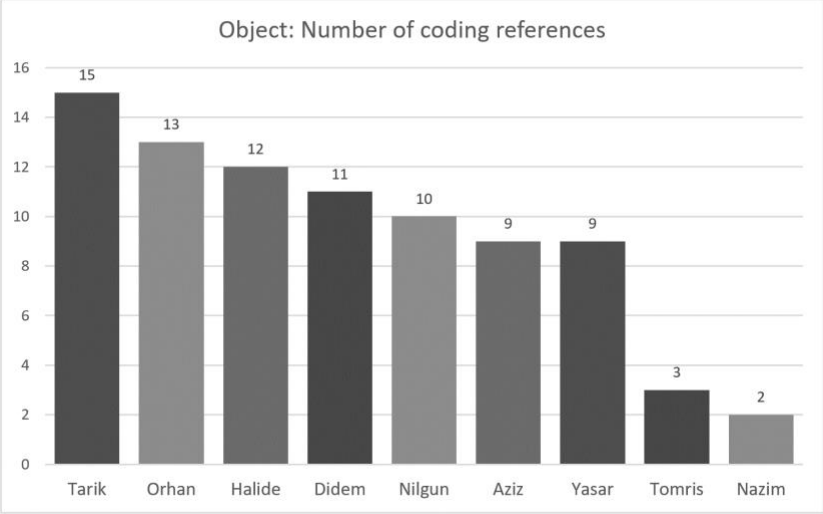
The Frequency of the Sub-categories in the Object Category

Object	Frequency	Object	Frequency
LMS	11	Camera	1
Web 2.0	8	Camtasia	1
Technical infrastructure	7	Chat rooms	1
Videos	6	Communication technologies	1
Learning resources	5	Concept maps	1
WhatsApp	5	Discussion boards	1
Interactive videos	4	Forums	1
Zoom	3	Instruments	1
Animations	2	Learning content	1
Computer	2	PPT presentations	1
Internet browser	2	Prezi	1
Kahoot	2	Screen-recorder	1
Multiple mediums	2	Second Life	1
Screen sharing tools	2	Smart book	1
Television	2	Turnitin	1
A webpage for feedback	1	Vyond	1
Articulate	1	YouTube channel	1
Blogs	1		
Total: 84			

Similar to the activity category, Tarik seemed to be using more references referring to the objects (Figure 8).

Figure 8

Number of Codes by Interviewee in the Object Category (i.e., NVivo Output)



Interactive videos, animations, Web 2.0 technologies, and Zoom were the most frequently cited objects by Tarik. Another interviewee who used many references of technological object was Orhan. Animations, technical infrastructure, videos, Web 2.0 tools, and WhatsApp were the most frequently mentioned in terms of object-related categories.

Knowledge

In the knowledge category (Table 7), 73 sub-categories emerged, and it was identified that the knowledge of theories is the most frequently (n = 32) emphasized knowledge type by the scholars interviewed. Among these theories, John Keller's motivation model (Keller, 1987) *ARCS* (Attention, Relevance, Confidence, and Satisfaction) was the most frequently mentioned theory (n = 5). Other theoretical knowledge included motivation (n = 4), readiness, (n = 4), adult learning (n = 2), flip learning (n = 2), cognitive apprenticeship (n = 1), Community of Inquiry Model (CoI) (n = 2), individualized instruction (n = 1), novelty effect (n = 1), relevance (n = 1), self-regulated learning (n = 1), TPACK (n = 1), and transactional distance (n = 1).

The knowledge of target audience (n = 7), synchronous instruction (n = 6), digital literacy (n = 5), evaluation and assessment (n = 5), structured process (n = 5), empirical studies (n = 3), model (n = 3), design (n = 2), general literacy (n = 2), reliable data (n = 2), and accessibility (n = 1) are the other technological knowledge types identified in the nine interviews.

Table 7

The Frequency of the Sub-categories in the Knowledge Category

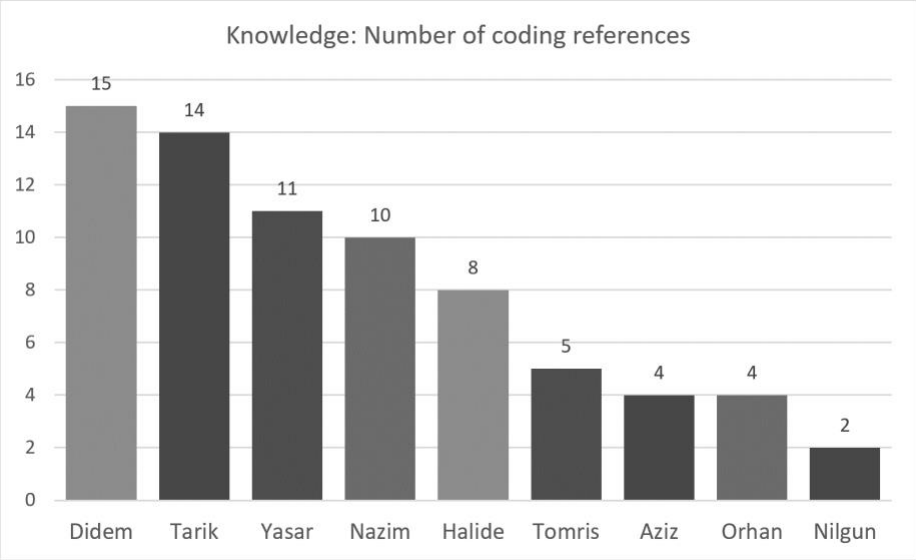
Knowledge	Frequencies
Theories	
○ ARCS	5
○ Motivation	4
○ Readiness	4
○ Adult learning	2
○ Flip learning	2
○ Cognitive apprenticeship	1
○ Community of Inquiry	2
○ Individualized instruction	1
○ Novelty effect	1
○ Relevance	1
○ Self-regulated learning	1
○ TPACK	1
○ Transactional distance	1
Target audience	7
Synchronous instruction	6
Digital literacy	5
Evaluation and assessment	5
Structured process	5
Empirical studies	3
Model	3

Design	2
General literacy	2
Reliable data	2
Accessibility	1
Total:	**73**

Figure 9 displays that Didem used more knowledge-related references (n = 15) in her interview, and she was followed by Tarik (n = 14), Yasar, (n = 11), Nazim (n = 10), Halide (n = 8), Aziz (n = 4), Orhan (n = 4), and Nilgun (n = 2).

Figure 9

Number of Codes by Interviewee in the Knowledge category (i.e., NVivo Output)



Nazim and Yasar referred more to the *knowledge of theories* compared to other participants. They particularly stated the critical role of motivation in distance and online learning settings as evidenced in the excerpt below.

> To motivate students, first, the instructor should explain every piece of information with examples and detail how that knowledge can be used in the daily life. Second, the instructor should tell stories as much as possible [to] support the content. Also, small group projects are very crucial for the students. Finally, the instructor should appreciate students at every opportunity to support their self-efficacy. [Appendix G, Line 335-338]

Similarly, Yasar noted that "faculty should attract student's attention to both subject and learning environment. Their strategy might be starting the lesson with a question or showing a picture" [Appendix I, Line 375-378].

Discussion

Interpreting digital technologies becomes challenging due to their intricate and complex nature, leading to uncertainty (Kaplan & Tripsas, 2008). Previous literature suggests that technology frames matter because they shape perceptions, attitudes, and decision-making processes (Spieth et al., 2021). Hence, a comprehensive analysis of technological frames within technology-enhanced learning environments is essential for advancing instructional strategies that foster intentional and impactful educational outcomes (Castañeda & Selwyn, 2018). In this study, we investigated the technological frames that the educational technology scholars we had interviewed used as defining their experiences in/with technology-enhanced learning environments such as online learning, e-learning, Web-based learning, distance learning, computer assisted learning, computer mediated learning, and open learning. As noted earlier, Mitcham's (1994), technological frame topology that includes four components: (1) object, (2) knowledge, (3) activity, and (4) volition guided our qualitative investigation.

Findings suggested that the *volition*, or an individuals' individuals' attitudes, intentions, self-realizations, normative judgments, and ethical decisions to use a specific technology (Keirl, 2018) was the most prevalently identified technological frame in most of the interviews. It is important to note that scholars from the Web-based learning and computer-assisted learning categories used less references to the volition aspect of technology, whereas the participants from distance learning and open learning incorporated more volitional frames in their narrative. This can be explained by the emphasis on tools such as Web and computers in their names.

In *Thinking Through Technology*, Mitcham (1994, p. 247) argues that "the intelligent control of technology" depends on two things: (1) understanding "what we should do with technology, the end or goal toward which the technological activity ought to be directed," and (2) grasping "the consequences of technological actions before the actual performance of such actions" (Mitcham, 1994, p. 260).

In line with Mitcham's argument on the intelligent control of technology, the findings from the interviews suggested that the *value* claims including scholars' normative judgments about what they should do with technology, how should they use technology, and who should control specific technology (Royakkers & van de Poel, 2011) was the most prevalent theme identified in the volition aspect of technology as described under the technology strategy category in the study of Huvila et al. (2021). For example, the characteristics of ideal administrators and faculty in distance education centers as well as ideal instructors in online learning were among the key findings of this study. For example, being comfortable with the Learning Management System (LMS), being a good instructional designer, and having a warm, friendly, and effective interaction and communication style with learners were among the normative recommendations to be an effective online instructor.

Another important finding was *ethics* where the interviewees noted several moral principles regarding the consequences of the non-intelligent educational technology use. Thinking and planning on the *sustainability* of the educational technologies (Niederhauser et al., 2018) was one of the concerns shared by one of the interviewees (i.e., Aziz) under the ethics category. As highlighted by Mitcham (1994), technological volition relates to contemplating the

potential "consequences of technological actions before the actual performance of such actions" (Mitcham, 1994, p. 260).

In Turkey, one of the largest-scale, government-supported educational technology initiatives, *FATIH Project* (i.e., the Movement to Enhance Opportunities and Improve Technology) is a crucial example of lack of volitional thinking by the project initiators in terms of sustainability and educational ecologies. For example, Ekici and Yilmaz (2013, p. 334) argued that FATIH Project was an ineffective initiative for the Turkish educational system due to the unclear project goals, lack of communication among the stakeholders, and concerns regarding the political, technical, and financial sustainability of the project. Ekici and Yilmaz's evaluation (2013) seems to be consistent with Tarik's claim that "technology is a necessary condition but not sufficient."

In addition to the sustainability, study participants also indicated other ethics-related concerns in the online, distance, and open learning environments, such as the distribution of faculty intellectual property (e.g., PPT presentations, recorded lecture videos, and exam questions) without the consent of the instructor (Liang & Chen, 2012). Accordingly, Halide who works as an instructional designer in a higher education institution and supports faculty for their instructional needs, noted that some faculty have asked her to disable the feature of "download video" in the LMS to prevent their video from being uploaded to YouTube. These concerns suggest that there is the lack of standardization in descriptive copyright statements of the course materials shared and distributed through LMS, e-mails, or video conference tools in Turkish higher education institutions. Digital licensing standards should be developed both for the individual work and collaborative work to circulate in the digital learning and teaching platforms.

Finally, *degree inflation,* the devaluation of academic credentials over time, caused and strengthened by the distance education centers in Turkey was an interesting discussion found under the volition aspect of technology (Castañeda & Selwyn, 2018; Goglio et al., 2022). This finding suggests that it is important to not only review the economic politics of the distance education centers and the financial contribution of online and distance learning courses to the university, but it is also vital to address and evaluate quality standards to ensure that the content, pedagogy, and tools of the courses are also considered.

As for the second prevalent frame, *activity,* refers to behavioral engagement with technological objects and knowledge. The current study revealed that activity-related conceptions used by the interviewees for all the conceptual categories included a variety of action verbs. These technology-activity verbs were divided into two groups: (1) Inter-activity and (2) Intra-activity. Inter-activity refers to instructors' engagement with technology to interact with the students or other stakeholders such as instructional designers, administrators, and teaching assistants. This two-way interaction includes examples such as motivating, mentoring, lecturing, presenting, and communicating. The second type, intra-activity, refers to the instructor's engagement with technology as interacting with the self. Intra-activities included instructor's learning, preparing, updating, practicing, and planning behaviors in the online/open/distance/Web-based/e-learning environments.

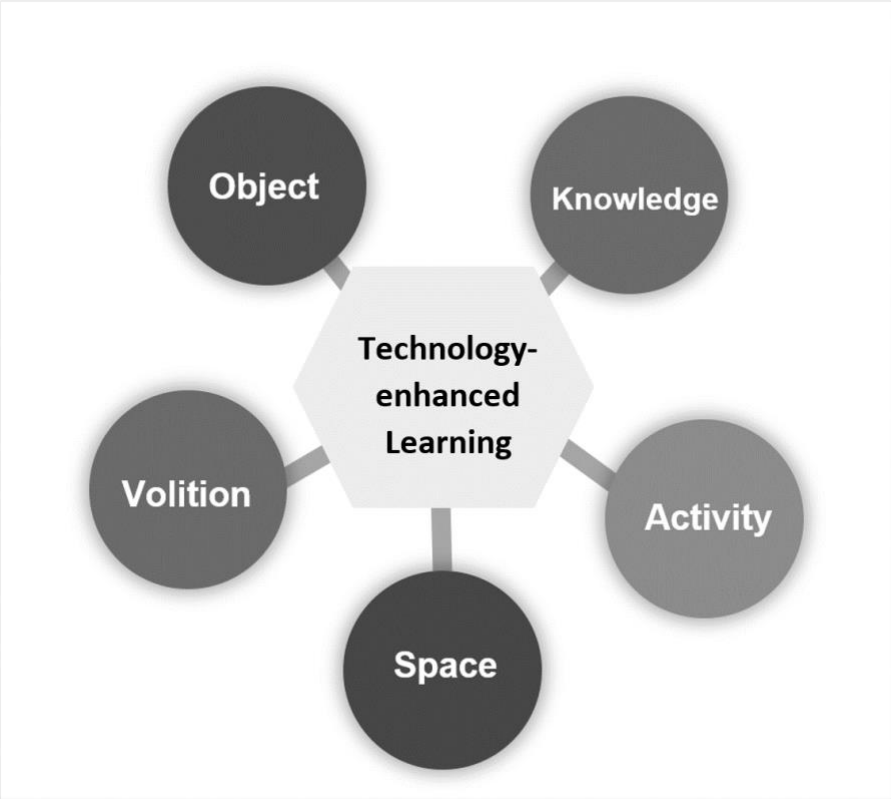
Third, the technological frames were also examined in terms of technological *objects*. Scholars from computer-assisted learning and open learning categories used more object related references in their narratives. Learning Management Systems (LMS) and Web 2.0 tools were the most frequently referenced objects by the study participants. In essence, it is not surprising to see the LMS and Web 2.0 tools on the top of this technological objects list due to their ease of use. For example, LMS platforms provide a structured and organized virtual space for both instructor and learners to communicate, collaborate, and exchange learning artifacts. Similarly, Web 2.0 tools provide external support to empower virtual students by giving them opportunities to collaborate, design, sketch, edit, modify, and publish the content (Hew & Cheung, 2013). Notably, one unanticipated finding was the use of a smartphone application, *WhatsApp*, as an alternative LMS for educational purposes as noted by these nine scholars. A potential explanation might be the simple interface of WhatsApp allows individuals to share text, audio, video, and figures with less clicks compared to a university's secure LMS.

Finally, in the technological *knowledge* category, (1) factual knowledge (i.e., basic terminologies), (2) conceptual knowledge (i.e., theories, models, and frameworks) and (3) procedural knowledge (i.e., "How to" knowledge such as design, evaluation, and assessment) were identified in all categories except computer-aided learning. It is somewhat surprising that knowledge of theories was found in this study as the most prevalent knowledge type pointed out by the interviewees in all learning/teaching concepts. This result may be explained by the fact that theories provide a logical consistency and explanatory power to describe the targeted phenomenon (Reeves et al., 2008). Another surprising outcome was that none of the interviewees mentioned *reflective knowledge* (i.e., "Self' knowledge such as experience, introspection, reflection, and precedents) as interacting with technology. Particularly, the use or importance of previous experiences and the role of reflection in different learning and teaching platforms was not addressed by these nine educational technology scholars. This finding suggests that faculty tend to prioritize objective experiences over subjective ones.

The results of this study are significant in at least two major respects. First, by uncovering the technological frames, we generated empirical evidence on how educational technology scholars perceive and experience technology, with a hope to better design educational technology programs. Second, this research brings a new dimension to Carl Mitcham's technological frames typology (1994). As indicated, in the original model, Mitcham describes that technology can be in four different formats including: (1) Object, (2) Knowledge, (3) Activity, and (4) Volition. In the interviews, all four of these aspects of technology were observed in all technology-enhanced teaching and learning situations with varying degrees. These findings echo Olsen and Engen (2007) who argue that technology is culturally and socially constructed. In addition, we identified a new technological frame, "Space," as presented in Figure 10, that indicates the significance of context to understand technology as argued by the SCOT (Bijker, 1995).

Figure 10

Manifestations of Technology in Five Ways- Object, Knowledge, Activity, Volition, and Space (Adapted from Mitcham, 1994)



Scholars who studied various technology-enhanced learning concepts, described both the physical location and the non-physical location of the learning and teaching environment as referring to object, knowledge, activity, and volition aspects of technology. For instance, when they talk about online learning, the technological knowledge (e.g., peer learning), technological object (e.g., discussion forums), technological activity (e.g., replying to peers' comment), and technological volition (e.g., respecting diversity in the class) were conceptualized in a space: the internet. In another example, the interview participant who described distance education as "a form of learning that happens anywhere anytime," referred to an abstract space where technology-enhanced learning is manifested. Similarly, in the definition of computer-supported learning, "it is a training via computer presentation, CDs and floppy disks, and interactive applications…" the physical tool-based space was emphasized.

The question of how physical space influences human learning has been studied from both psychological and physical perspectives (Brooks, 2011; Chism, 2006). In the realm of environmental psychology, researchers explored concepts such as people's emotional connection to places, their comfort levels in different spaces, and how various environments can motivate and inspire (Graetz, 2006). Likewise, the researchers also investigated the physical aspects of space, including lighting, temperature, color, layout, and sound, to understand how these factors impact learning (Talbert & Mor-Avi, 2019).

The findings of the current study suggest that space matters online too, and, accordingly, we need additional research on how online space affects learning, cognitive engagement, motivation, and the overall educational experience. Such findings also echo McLuhan's (2006) notion of "the medium is the message," which underscores that the way information is delivered or transmitted through a medium has a profound impact on how it is perceived and understood, often overshadowing the content itself (McLuhan, 2006). Similarly, this study's results suggest that the medium, technology, preserves a multitude of communicative interactions where it becomes not only a mere object but also a space, knowledge, activity, and volition at once. For a comprehensive understanding of technology-enhanced learning, it is necessary to examine the interplay between these five dimensions as a cohesive whole.

Limitations

This study has several limitations. The first limitation is that the interviews were carried out during the pandemic. Thus, study participants' responses to the interview questions might be affected by that unexpected teaching experience and other related societal constraints at the time. A second limitation concerns the generalizability or transferability of findings. Since data sources of this study are from Turkish context, the implementations of the findings in another context should consider cultural, social, political, and geographical variables.

Conclusion

As Tarik, a professor of a distance education program, insightfully reflected on the intriguing Netflix show "Black Mirror Bandersnatch," "technology shapes not only our experiences but also the very essence of our interactions." This observation underlines technology's ability to blur the boundaries between reality and virtuality, compelling us to contemplate the significant role of technology in shaping our perceptions.

This interpretive phenomenological study was designed to explore the meanings that educational technology scholars attach to technology-enhanced learning environments. The findings highlighted the significance of *volition* as the most frequently identified frame regarding technology use. Surprisingly, theories were the predominant form of technological *knowledge* mentioned by the participants, suggesting their importance in understanding and explaining educational technology phenomena. Notably, the concept of *space* was introduced as a new technological frame, where our activities, intentions, and experiences take place. Analyzing the five dimensions of technology—object, knowledge, activity, volition, and space—offers researchers, educators, and educational technology practitioners a holistic understanding of how individuals interpret technology and recognize potential challenges within educational environments. By gaining insights from these technological dimensions, stakeholders can navigate the complexities of technology and collaboratively shape more effective and inclusive learning approaches.

Disclosures

The authors declare no funding associated with this research.
All authors have no conflict of interest to report.

Data Availability

Interview data for this study is available upon request. Please contact the first author for access to the data (Merve.Basdogan@ttu.edu).

Ethics Board Approval

This research study received institutional review board (IRB) approval from Indiana University's Human Research Ethics Committee (IRB Protocol Number: #1909857471).

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Appendix A
Interview Protocol

INTERVIEW PROTOCOL

Critical Analysis of Online Education Concepts and Trends in Turkish Doctoral Dissertations

OPENING

- Greet the interview subject.
- Confirm that it is OK to record. Tell interviewee that you would like this permission on the recording. *[BEGIN RECORDING]* "May I ask you to give your permission to record our interview?"

[After this point, if interviewee wants to stop, thank the interviewee again and stop the interview.]

INTRODUCTION

We are conducting this study to understand the use of different concepts about online learning including e-learning, web-based learning, distributed learning, computer supported learning, computer assisted learning, computer mediated learning, virtual learning, open learning, online learning, and distance learning.

Question 1: We know that online education literature has many different forms of concepts that are sometimes used interchangeably. In your dissertation research, you studied <insert concept here>

Would you please tell us about yourself and your study area?

Question 2: How do you define <insert concept here> learning in your research?

- *After they share what their definition and if they do not elaborate*
  - If you don't mind sharing, can you tell me a bit more about the purpose, format, interactions, concerns and instructional goals of this type of learning?

TOOLS AND TECHNOLOGIES

Question 3: How are the tools and technologies in <insert concept here> learning to support teaching/learning activities used?

- Can you give me an example?
  - According to the example, clarify the connection between examples/artifacts and their definition.
- *If no,* what are the essential technical elements in a <insert concept here> learning design?

INSTRUCTOR ROLES

Question 4: When you look at the course designs in <insert concept here> learning, do you sense that instructors' roles change from the other type of learning designs in some way?

- *If yes,* can you bring an example to mind?
- *If no, then say* "what are the similar instructor roles in different online learning forms." (give time to think)

Question 5: How would an instructor of a <insert concept here> learning support communication and interaction among the learners and instructor?

- What do you think about community building among the students and instructors in <insert concept here> learning?

Question 6: Do you ever feel that the pedagogical approaches of teachers in <insert concept here> learning are different than other forms of online learning design?

- Would explain that for me? Give an example?

Question 7: Feedback is a good way to allow students to gauge their performance. How would <insert concept here> learning environments support feedback?

- Would you explain what are the ways assessing student performance in <insert concept here> learning?

WRAP UP

Question 8: Before we finish, I have a kind request from you:

- Can you please create a blank Microsoft Word Document or use a paper, and type/write down the most commonly used keywords, terms, or phrases in <insert concept here> learning such as terms, theories, processes, and instructional strategies.
- *Thank the interviewee for his/her help with the study.*