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Communicative constraints in formal online education

A case study of “Zoosemiotics: Umwelt and Animal Communication” course

Master’s thesis

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## Table of contents

Introduction .....	3
1. Education and medium .....	5
1.1 Multimodal theory of communication .....	5
1.2 Education as multimodal communication.....	14
2. Digital online media affordances and constraints in formal education .....	21
3. Current methods for overcoming constraints – a case study .....	30
3.1 Materials and Methods.....	30
3.2 Analysis .....	33
3.2.1 Discourse.....	33
3.2.2 Design.....	34
3.2.3 Production and distribution .....	38
4. Alternative methods in overcoming constraints and possibilities for their application .....	51
Conclusion .....	55
References .....	58
Kokkuvõte .....	66

## Introduction

After 2020, online learning can hardly be considered a novelty. Teachers and students all over the world were forced to leave the classroom and sit in front of their computers. Although there have been a lot of successful examples of transitioning to online education, such as edX, Coursera and private online courses offered by different educational institutions, the massive transition to the complete online environment proved to be somewhat troublesome. Different technological and psychological barriers arose (Yeh, Tsai, 2022), which influenced the efficiency of education. These obstacles have been studied from multiple perspectives. The latest research inquiries include quantitative and mixed research on obstacles, including communicative, for both – teachers and students – and are conducted mainly within the framework of educational studies (Anjum et al., 2020; Song-Arsa, 2020; Tartavulea et al., 2020; Çelik et al., 2023). Since education is a process involving at least two parties, communication between them influences the overall process of knowledge construction, which was underlined in the studies. However, most of the works focus on the reasons for the barriers and effects on the efficiency of communication and do not aim to analyse the tools used in education to overcome the barriers. In the present thesis, I address the communicative obstacles of online education from the perspective of multimodal theory of communication. Therefore, the **objective** of my research is to map out the communicative constraints for education which may be raised by digital online media and examine the possible solutions. In doing so, I need to answer the following **questions**:

1. How are the communicative constraints raised by digital online media manifested and addressed in the current online education practice?
2. What are the possible solutions to those constraints besides the ones already existing in practice?

To answer these questions, I employ the following **methodologies**: literature review and case study by means of multimodal discourse analysis. The **object** of my research is the online course “Zoosemiotics: Umwelt and Animal Communication” on the Moodle platform as a part of the University of Tartu Department of Semiotics curriculum .

In the first part of my work, I elaborate on the theoretical framework of the thesis, with a specific focus on the notions of media and education. To do so, I turn to the multimodal theory of communication developed by Gunther Kress and Theo van Leeuwen (2001). I provide and briefly analyse their main theoretical standpoints. Subsequently, I employ those theoretical standpoints to education and analyse it as an instance of multimodal communication. In addition to that, I elaborate on notions of education and learning and explicate the definition of formal education.

Furthermore, in the second part of my research, I apply the theory to discuss the constraints and affordances provided by digital technologies, building upon multimodal theory of communication, as well as the latest multimodal and cognitive research on problems brought by digital online media. Online education provides certain advantages regarding time, space and resources. However, there is a number of spatial and sensorial constraints involved. Moreover, different combinations of spatial and temporal factors can lead to an interchange between different contextual layers (Jones, Chick, Hafner, 2015), which can be perceived as another constraint of online formal education brought by digital media. Additionally, coordination constraints of online communication are discussed as applied to online formal education.

Later, in the third part, I conduct a case study of a formal online education course, implementing multimodal discourse analysis to establish the presence and current methods used in overcoming constraints described previously.

Finally, in order to lay a foundation for further practical implementation of my work, I elaborate on the possible alternative methods of overcoming the constraints of formal online education, building upon the theoretical inquiries, conducted analysis and dialogical knowledge approach framework as developed by Paavola and Hakkarainen (2005, 2009, 2021).

## **1. Education and medium**

What is one thing an average student of the semiotics department of the University of Tartu probably does almost every day besides drinking coffee? Consulting Moodle – an online learning management system – on the topics of home assignments and texts to read. However, no more than approximately 20 years ago, the main consultant for the assignments was a student notebook. The invention of computer technologies and the Internet, in particular, has brought new opportunities for our daily lives, as well as for our educational systems. Digital innovations have provided modern education with new tools, hence, new learning modes and media. Formal lessons are no longer limited to the classroom but can happen almost anywhere and anytime, provided that participants have access to a stable Internet connection. The traditional understanding of media in education has shifted. In the present chapter, I will explore this shift, relying on the multimodal theory of communication.

### **1.1 Multimodal theory of communication**

We live in a time when novel modes are being created and actively used. We post pictures with texts on Facebook and photos with music on Instagram, we go to 5D cinemas, and we can even teleport to a different reality with the help of VR. Education is not an exception. There are a lot of different modes involved. However, different media can be characteristic of different modes. In the case of the mode of sound, we would rather think about a mp3 music file or vinyl, than paper. Although, music can be translated on paper with the help of signs. Moreover, different

media and modes have different affordances and constraints. For example, some media can convey only visual information, others – only olfactory. To avoid any confusion between the general ideas and terms, I will take a quick glance at the cornerstone ideas about multimodal communication.

Multimodal communication can be perceived from different standpoints. For example, it can be approached from the point of view of linguistics. In this case, communication would be perceived from two sides – interaction among communicators and the creation of physical artifacts. In the former situation, communication is divided into speech, gestures and embodied behaviours (Dancygier, Vandelanotte, 2017). In other words, the meaning of communication is understood as a result of the combination of verbal, non-verbal and paraverbal behaviours. In the latter case, the combination of linguistic forms with other sensorial inputs, such as visual, aural, etc., in a physical artifact is analysed. Overall, linguistics is more focused on the message and its form, with the exception of a subdiscipline of sociolinguistics. However, in this work, I am interested not only in the message and its form but also in how the meaning of the message is made and communicated by participants. Therefore, resorting to the semiotic standpoint seems to be a more appropriate path.

According to Theo van Leeuwen and Gunther Kress (2001: 111), there are two main pillars of multimodal theory – semiotic resources and communicative practices. Semiotic resources are the tools necessary for the process of meaning-making – semiosis, or, as van Leeuwen later elaborates: “the actions and artefacts we use to communicate, whether they are produced physiologically [...] or by means of technologies” (van Leeuwen, 2004: 3). Those tools are modes and media. However, they cannot exist independently. They are realized in and created by communicative practices. An act of communicative practice is a process of reciprocal articulation and interpretation of a semiotic product, also known as text. Every communicative act includes four non-hierarchical semiotic strata: 1) discourse; 2) design; 3) production; 4) distribution (*Ibid*). Non-hierarchical nature also expands into the temporal frames. These strata may perform simultaneously as well as one after another. Moreover, every text possesses a content and expression side – an idea going all the way back to Ferdinand de Saussure’s *arbor* and the relations of form and substance, expressed by this classic example (de Saussure, 1959 [1916]). The four abovementioned strata provide the existence of those sides. The first layer is related to the content of communication, the latter two deal with expression, and the second layer stands in between. All of them possess and act out their own semiotic potential. That is to

say, the affiliation of discourse with content does not deprive other strata of adding to the meaning of the content. In other words, the meaning-making process happens within all the strata. Finally, the strata participate not only in the articulation of the text but also in the interpretation of it. The text is created by discourse, design, production and distribution of the author and interpreted according to the receiver's semiotic knowledge about discourse, design, production and distribution (Kress, van Leeuwen, 2001). Genres of mockumentary or pseudodocumentary may serve as an illustration of how discrepancies between the author and the audience on the levels of discourse, design, production and distribution may influence the overall interpretation of the text. These genres' products are designed and produced to blur the border between reality and fiction, which they do, using the combinatory rules of semiotic resources for design and production that are common for the documentary genre. For example, small interviews with the main characters of the film, which are characteristic of documentaries, may be used in a comedy film, which does not base its plot on real life. Therefore, when the receiver lacks knowledge about the design and production of a mockumentary, they may fall prey to the movie and believe that all the characters are NOT fictional and the resemblance to real persons, living or dead, is NOT coincidental. Even disclaimers may not save the audience from confusion, like in the case of the movie "The Blair witch project". According to the research conducted by Margrit Schreier (2004), around 40% of respondents were uncertain of the fictionality of the movie, notwithstanding the disclaimer that the movie provided.

In the present work, I will mainly focus on the strata of design, production and distribution since they are connected to the notions of mode and medium. Due to the aim of this work being an analysis of the articulation of the communicative constraints, the main focus will be on the articulation layers. Nevertheless, a few words should be said about the discourse, since it is a part of the communicative act, which plays an important role in both – articulation and interpretation processes. It may be considered quite a buzzword for different scientific disciplines. This concept has been used in linguistics, social studies and various interdisciplinary research, such as sociolinguistics or pragmatics. I would employ the social semiotic understanding of discourse, according to a definition given by Van Leeuwen and Kress, who understood discourse as "socially situated forms of knowledge about (aspects of) reality" (Kress, van Leeuwen, 2001: 20). These forms of knowledge can be implicit or can be explicitly articulated, in which case they become an ideology. Furthermore, discourses cannot be separated from the social institutions by which they are produced (Kress, 2010). From the point of view of articulation, discourses are involved in dialectical relations with

communicative practices – the texts are based on discourses, and at the same time, their realisations transform existing discourses. From the point of view of interpretation, discourses play a very important role in providing the main framework according to which the text is perceived. In case the discourses are different between the author and the audience, the communicative purposes of the text may not be achieved.

As it was mentioned above, design takes a stand between content and expression. It is an abstract articulation of the discourse, or, as Kress and van Leeuwen put it, “conceptualisation[s] of the form of semiotic products and events” (Kress, van Leeuwen, 2001: 21). Design exists in the present, but it also peeks into the future: “[design] focuses on my interests now in relation to the likely future effects of my actions” (Kress, 2010: 6). At the same time, there is a difference between design and rhetoric (*Ibid*, 26). The latter is responsible for the consideration of the extratextual factors such as the “her or his interest; of the characteristics of the audience; the semiotic requirements of the issue at stake and the resources available for making an apt representation; together with establishing the best means for its dissemination” (*Ibid*, 26). These considerations serve as a basis for design. In this framework, the job of choosing the appropriate modes falls onto the rhetor’s shoulders, whereas a designer serves as a bridge between rhetor’s interests and production. However, according to Kress, a rhetor and a designer are quite often one and the same person (*Ibid*). Furthermore, design is tightly connected to modes since those are semiotic resources in use on this layer. The definition of a mode is somewhat problematic and produces fruitful soil for discussion. In the book of 2001, the main definition of mode was “semiotic resources which allow the simultaneous realisation of discourses and types of (inter) action” (Kress, van Leeuwen, 2001: 21). There was no elaboration made on what makes certain semiotic resources a mode besides a notion that “media become modes once their principles of semiosis begin to be conceived of in more abstract ways (as 'grammars- of some kind)” (*Ibid*, 22). From this statement an assumption arises, that modes are media that became more abstract. Moreover, the social nature of mode was not emphasized. There was only a mention about the influence of discourse on it. However later Kress would underline the importance of the social aspect in the understanding of the notion of mode: “A mode is that which a community, a group of people who work in similar ways around similar issues, has decided to treat as a mode” (Andersen et al., 2015: 77). At the same book, he also stated that something can be defined as mode, in case it fulfils three communicational metafunctions developed by Halliday (1978). These functions are ideational, interpersonal and textual. As explained by Kress, these are the functions of: “saying something about the world,



being able to describe social relations and producing entities which are coherent internally and with their environment” (*Ibid*, 77). They were developed by Halliday within the bounds of linguistics and served as an inspiration for different social semioticians, including Kress and van Leeuwen. In the article on multimodal literacy by Mills and Unsworth (2017), references to the Hallidaian metafunctions also can be found. They mention the “unique organizational principles, involving elements and conventions that do not have precisely equivalent” (Mills, Unsworth, 2017: 5) which coincides with textual metafunction. Later they also state that “[a]ll modes of meaning can be used to convey the power or status of the created text, the viewer or reader, the represented subjects, and the relations between them” (*Ibid*, 2017: 6), which represents the interpersonal metafunction. Although ideational metafunction is not explicitly mentioned, it is quite hard to contest a statement that meaning-making process is ideational. The non-ideational meaning-making would not say anything, therefore would stay silent. The broader definition of a mode opens up opportunities to analyse different phenomena within the framework of a multimodal discourse theory. Moreover, it provides some rules for operationalization of a mode – it should be accepted by a social group and fulfill three metafunctions. This is not possible in a case when we perceive mode as a semiotic resource for meaning-making (*Ibid*, 5), since there is no elaboration on what is considered a semiotic resource or not. However, at the same time, the broader notion blurs the lines between modes and non-modes even more than a classical one and leaves it up to a researcher to define and prove the modality of a research object.

Briefly summing up what has been discussed about the notion of mode, it can be understood as semiotic resources, fulfilling three communicational metafunctions and performing as abstract rules for the meaning-creation, which are defined (not necessarily physically codified) and realised by the community in which they are performed, hence can be changed according to the needs of the community.

The very existence of design is foregrounded in the multimodality itself. In monomodal communication, there is no question as to the function of different modes within one communicative act (Kress, van Leeuwen, 2001). It simply cannot be, since modes are separated and exist only by themselves. However, monomodal communication is characteristic only for simple communication with low cognitive load. With rising communicational complexity and cognitive load, different modalities start to merge (Oviatt, 2004). Communication becomes more multimodal. And when this happens, one faces different affordances and constraints

coming into play. An idea which can be easily expressed by the artist on the canvas may be harder for a composer to convey. Therefore, while using both of those modes in one communicative act, the affordances and constraints of each are taken into consideration. In terms of interpretation, not only does the semiotic knowledge of design matter for the final outcome, but also something called redesign or “readers’ design of meaning” (Kress, 2010: 37) comes into play. Redesign is possible for complex multimodal texts where the receiver can combine and reinterpret the elements in a manner suitable for them. Resorting to the example of Gunther Kress, we can think about a website where the most attention is paid to the elements necessary for the visitor, while others can be overlooked (*Ibid*). For some people, the marketplace on Facebook may be the most important element of the platform, whereas for others it is the main source of news information. Therefore, for the latter users, the features of the Facebook market may be not paid attention to if not overlooked. The same effect may appear in the case of non-experienced user who is not fully aware of some features. In this scenario, exploring the social platform more would lead to the transformation of an initial reader’s design. Expanding the idea of redesign even further, one can think about the constraints provided by different sensorial inputs. A person having eyesight disorders would experience the website in a different way from one with no visual impairments. For example, audial elements may matter more than visual ones. Hence, this person’s redesign would differ from the design of meaning of a person with good eyesight.

The relations between design, discourse and production are intertwined to a very high degree. First of all, design receives constraints from the side of the discourse. Discourses cannot be articulated by every mode and in any medium. Therefore, they limit the choice of modal, and thus material, resources for a rhetor. Moreover, discourses assign meanings to the elements of the mode, which initially exist as signifiers. In other words, every mode is interpreted differently depending on the culture where it is realized. Simultaneously, designs can influence discourses. In the process of conceptualization of discourse expression, designers can creatively combine different modes and media and break the limits imposed by the discourse. To illustrate this, I would like to turn to a TV series which has creatively combined television and social networks to establish a common holistic meaning. The Norwegian TV series “Skam”, which aired from 2015 until 2017, made use of not only television screens but also smartphones’ ones. Intersemiosis, a combination of different semiotic codes (also can be understood as modes) which produces holistic meaning, was created by producers who made Instagram pages for all the main characters. These accounts not only provided the expansion of the series into the real

world but also elaborated on the plot of the series, providing more details. The producers of the Italian remake of the series expanded social media aspect even more, posting screenshots from the WhatsApp chats of the main characters. Therefore, on the level of design, the understanding of a conventional television-making process was reconsidered and expanded. Moreover, there are certain limitations from the side of production too. As it was stated above, not every mode can be expressed in every medium. The medium in which the design is to be carried out imposes limitations on the number of modes to be used. For example, if one is to carry out an advertisement campaign on posters, the mode of sound falls out of design considerations, since it cannot be easily implemented onto a simple poster.

Finally, I need to elaborate on the notions of production and distribution. These strata can sometimes be perceived as the same thing since they are the expression of the communicative content. Nevertheless, they are different. “Production is the articulation in material form of semiotic products or events” (Kress, van Leeuwen, 2001: 21). It deals with media and material texts. Distribution focuses on “technical ‘re-coding’ of semiotic products and events, for purposes of recording (e.g. tape recording, digital recording) and/or distribution (e.g. radio and television transmission, telephony)” (*Ibid*, 21). Initially, it is just supposed to record and transmit texts to different recipients. However, as I will describe later, it possesses a very strong semiotic potential in itself. The semiotic resources for distribution are also media.

Media are “the tools and the materials used” (Kress, van Leeuwen, 2001: 22) for fulfilling a design or a discourse in a material world. They are the carriers of meaning, which makes them different from modes. That is not to state that media does not add to the process of meaning-making. The carrier can change the content to a certain degree. Let us just think about how a gift presented by our loved ones would differ from a gift presented by a stranger or a person we do not appreciate. Just as a generous giver, medium adds up to the overall content of the communicative act. However, the main question media ask is: in what way do we communicate the meaning? Whereas mode is concerned with how we represent the meaning (Andersen et al., 2015). What media and mode have in common is their cultural dependence. They both are culturally dependent in terms that their meanings and importance may differ from one group to another. Moreover, every medium possesses a certain experiential meaning potential, which serves as one of the two meaning-making mechanisms in production. Another mechanism, namely sign provenance, invokes the discourse directly, without resorting to design (Kress, van Leeuwen, 2001). The experiential meaning potential deals with the material

qualities of the resources and the meanings those qualities invoke. The provenance depends exclusively on the context of the communicative act. The experiential meaning potential exists in virtually every material entity of all the sensorial inputs. Some of those meanings are culturally dependent. In Chinese culture, black colour is a symbol of men and white of women. These meanings root in the Confucianist notion of 阴阳 (yīnyáng). However, if one moves to North America and visits Navajo Indian tribes, they will discover that there white colour symbolizes men (MacKenzie, 1922). At the same time, it seems that not all the meanings are purely culturally dependent. There is a number of studies confirming that certain patterns in ideophones<sup>1</sup> occur cross-culturally (Vigliocco, Kate, 2007; Dingemanse, 2011; Dingemanse, 2012). Moreover, in a study from 2007, ideophones from the Japanese language were successfully coupled with their meanings by participants with no knowledge of the Japanese language itself (Iwasaki, 2007). This phenomenon is connected with the non-arbitrary feature of language known as iconicity (Dingemanse, 2015). If this phenomenon is extrapolated to the wider definition of language, the one which exceeds the linguistic boundaries, it can be speculated that non-arbitrary features can be found in other symbolic systems. As an example, I can refer to works of Paul Ekman, who conducted experiments in different cultures and established, that the recognition of certain facial expressions of emotion stayed consistent notwithstanding the cultural background (Ekman, 1972; Ekman et al., 1987). Furthermore, according to Gunther Kress (2010), every instance of meaning-making is non-arbitrary. Overall, I can sum up the notion of the medium as a material carrier of the content, that is to be expressed by the text, which possesses its own meaning potentials, dependent on the community or non-arbitrariness.

At this point, it may seem that production is the last step for the meaning-making process. However, the distribution should not be overlooked. Just like in the case of media, distribution may sometimes be blamed for being incapable of adding up to the overall meaning of the content. In its raw form, it, indeed, presupposes the direct transmission of the original. For example, a stand-up comedy concert was recorded and posted on a streaming platform for anybody willing to see. The comedian is the same as at the performance, the jokes are the same, but something is different. This difference comes from another essential component of the distribution layer – re-encoding. To transmit something to a larger scale, one should translate it

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<sup>1</sup> A vivid representation of an idea in sound. A word, often onomatopoeic, which describes a predicate, qualificative or adverb in respect to manner, colour, sound, smell, action, state or intensity (Doke, 1935: p. 118).

to another distribution medium, which inevitably leads to reduction (Kress, van Leeuwen, 2001). When one watches a stand-up performance on a laptop while lying on a couch, they reduce the presence of the audience, they reduce the warm-up part by other comedians, and, sometimes, they reduce some jokes due to the montage. Moreover, they reduce the inability to pause the performance whenever they want, which may be perceived as a certain advantage by a modern-day viewer, but also influences the continuity and the overall perception of the performance. All these reduction processes lead to the loss of the original context. Or something that Walter Benjamin calls an ‘aura’ in his essay on *Art in the age of mechanical reproduction* (Benjamin, 2007 [1935]). For him, the loss of aura meant the loss of the original’s authority. However, Kress and van Leeuwen (2001) approach this issue from a slightly different angle and perceive the reduction as a shift of meaning: from the meaning-in-context into the meaning-of-itself. In other words, although the initial details of meaning, which depended on the context, disappear, all other constitutes remain. Moreover, new peculiarities of meaning can arise specifically from the shift to a new media. While watching this same stand-up special at home, the opportunity to put a video on pause provides a chance to discuss a joke with a friend in order to find out some interesting details about it. A deed which would be considered bad manners during the actual concert and condemned by people around. Furthermore, with the development of the distributive medium, new details of meaning may arise, since distribution is a spectrum with transcription as an instance of complete reproduction on one end and complete fusion between distribution and production on another. Later in 2005, Gunther Kress would employ a notion of ‘gains and losses’, talking about the differences in representation in articulation via different modes (Kress, 2005). The difference between the older and newer approaches is that in the latter Kress underlines the affordances when modes shift and not only reduction. Another perspective on media bringing about new meanings is provided Bolter and Grusin (1999), with their concept of remediation – “representation of one medium in another” (*Ibid*, 45). They claimed it to be a “defining characteristic of the new digital media” (*Ibid*, 45). Remediation is also perceived on a spectrum. On one end there is implementation of an older medium for the functional reasons, on another end – a total assimilation, or absorption in authors’ terms, of the older medium by a newer. However, this absorption cannot be complete, due to the nature of remediation, by which “new medium remains dependent on the older one in acknowledged or unacknowledged ways” (*Ibid*, 47). In between, there are instances of emphasizing the differences between media and refashioning of the older media for new needs.

To summarise, in multimodal communication, the creation of a particular product's meaning does not reside only on one stratum. It is the result of intercommunication between all of them. The discourse provides the knowledge for design and production and, at the same time, is changed by them. The design provides a conceptual framework for the semiotic product with the help of modes which are dependent on both – discourses and media. The production makes use of the material world resources, which bring their own potential meanings to the plate. Finally, the distribution is capable of providing a greater degree of accessibility, with the price of reducing the meanings, added within other strata, via re-encoding.

## **1.2 Education as multimodal communication**

Although education and learning are terms very familiar to most of us, defining them would pose a certain problem. There are different educational theories which are grounded in different learning theories. Hence, the definition of both terms depends on what theory do you stick to. The main approaches which I found in Paul Bélanger's work are behaviourism, cognitive education, constructivism and humanistic theory (Bélanger, 2011). Historically, the oldest of these approaches is behaviourism. Behaviourists start off from the basis that one cannot analyse the cognitive activity of an individual, and, therefore, the behavioural patterns of stimuli and response to it should be the main focus of the analysis. Hence, the learning is perceived as the acquisition of information about appropriate responses to different stimuli from the educator<sup>2</sup> to the student. Education is the transmission conducted with the help of positive and negative reinforcement. Contrary to behaviourism, cognitivism perceives learning not as a passive transmission of information, but as an active mental processing of information by students. Hence, education is the process of inducing the mental activity by creating the knowledge gap and not giving ready-made answers. Constructivism, as well as cognitivism, focuses on internal processes. However, it underlines the fact that learning is construction of knowledge through contextualised experience. Therefore, education is the process of engaging students into meaningful contexts to create knowledge. Humanistic theory slightly deviates from all of the

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<sup>2</sup> Although there are certain differences between the terms 'educator' and 'teacher' in my work I use them interchangeably. I also use the terms 'learner', 'reader' and 'student' interchangeably.

above. It is quite close to the concept of edusemiotics, as defined by Semetsky and Stables (2015). Both of these approaches build upon the belief that there are no ultimately wrong answers, there are interpretations. The difference here can be found in the attitude towards humans. Edusemiotics does not explicitly consider human moral orientation, whereas humanistic theory underlines the natural internal goodness in people. Overall, the humanistic theory perceives learning as moral and intellectual development of students via inducing their mental activity (Johnson, 2013). As apparent, it is quite similar to cognitivism and constructivism. Where these approaches differ is the understanding of education. Education in a humanistic approach is perceived as a process of inducing mental activity with the student themselves defining the main source of the educational content. (Bélanger, 2011)

Although all of the approaches described above differ in how they define learning and education precisely, there are some similarities between them. All the definitions of learning have to do with the way the knowledge is acquired, cognised or constructed by the subject. Education, in its turn, is perceived as actualisation of the learning process in life. In other words, learning is a subjective individual process. To analyse it, one needs to use certain tools dependant on the educational approach and apply those to certain individuals or group of individuals. Whereas education is not a subjective process insofar, that it is an activity aimed to induce learning process. Education does not happen within a person, it is a set of practices which leads, or does not lead in some unfortunate cases, to learning in an individual. These are the understandings with which I will proceed further, with more precise definitions leaning to the constructivist, due to the nature of the main theoretical framework. Another similarity which is noticeable between the definitions of learning is the presence of certain knowledge gap necessary for learning. In behaviourism it is the absence of certain stimuli, in cognitivism, constructivism and humanistic learning – the absence of ready-made answers. This redundancy is also found in Vygotsky's notion of the zone of proximal development – the distance between what a person has already acquired and what this person can acquire with some additional support (Vygotsky, 1978). According to Lemke, redundancy in education can be provided by the combination of different modes in one communicative situation (Lemke, 1998). Moreover, Gunther Kress and Theo van Leeuwen (2001) use education to illustrate multimodal concepts in their book multiple times, underlining its multimodal nature. Hence, education can be viewed through the lens of multimodal communication theoretical concepts. In this part, I would like to do precisely so through the general analysis of the semiotic layers of education. However, before continuing, an issue which has been there throughout the text should be addressed. That

is a topic of formality and informality of education. It was implicitly taken for granted above, that when I addressed traditional education, I was talking about formal education. Nevertheless, modern education offers many different opportunities, which draw upon their own semiotic tools. It is important to establish the notion and delineate the borders of formal education in order to conduct a more precise analysis later.

According to the Council of Europe (n.d.), formal, non-formal and informal learning can be distinguished. Here the term learning is used, however, the difference between those is the nature of how this learning is induced – education. The main characteristics of formal learning are the presence of a syllabus, intentionality of learning (*Ibid*), and, according to Johnson and Majewska (2022), presence of educational institutions, i.e. learning is happening within schools, universities etc. Non-formal learning takes a stance between formal and informal. It happens outside of the educational institution, but the structure is still preserved (Council of Europe, n.d.). This stance is argued by Johnson and Majewska (2022), since they perceive it as a possibility but not a requirement. Moreover, they state that non-formal education may happen within educational institutions too. The point of convergence for the two stances is that learning is still intentional and recognizable by the students, as well as the optional presence of curriculum. Finally, the understanding of informal learning seems to be the same in both sources. Informal learning is non-intentional, non-structured, non-recognizable and is not limited spatially. In this work, formal education is understood as a process inducing intentional learning within educational institutions and with structured curriculum.

The stratum of discourse in education depends on the society in which communication is to be carried out. Therefore, education as a communication process will differ from culture to culture. A stance that seems self-evident but may play a greater role when one starts dwelling on the topic of online education. It is plausible to imagine that understanding of education in a culture where most of the population is tech-savvy will differ from one, where technology is treated with a certain degree of caution. This all is to propose, that the efficiency of certain forms of education depends on the discourses about education in the culture in question. Therefore, where the discourse strongly opposes the usage of certain modes and, thus, certain media, or, maybe, when certain media are out of reach in a society, the efficiency of these modes and media in education can be questionable. It should be noted that these ideas are more of a hypothetical nature and require further clarification and exploration elsewhere, since the main focus of this paper is on the articulated communicative constraints in online education.



When it comes to the layer of design in education, the notion of instructional design immediately crosses one's mind. This is a uniting term for various theories and models of how the educational process should be carried out. Instructional design is a practical implication of the ideas proposed by different psychological and communicational theories (Kang, 2004). Some of the theories are more suitable for the lesson design, and some of them are more applicable to an overall curriculum design. Therefore, a further division within the stratum of design in education can be seen – curriculum level and performance level. Design on the level of curriculum is very closely connected with the main discourses of the community. As Kress and van Leeuwen (2001) notice, for the Anglophone societies in the late 90s, curriculum provided very rigid frames of what to be taught and learned and when. The design of a lesson is, however, different. The educators may be limited by the official curriculum, but there may be other discourses in the play, which would influence the final blueprint of the lesson. For example, since 1 September 2022, a special type of propagandistic lesson named “The conversations about the important”<sup>3</sup> was introduced to the Russian schools' curriculum. The content of the lessons is very strictly defined by the government. The lesson plans and lesson materials are made in advance, distributed online, and a teacher is just to participate as a transmitter of those. Nevertheless, some of the teachers do not consent to the official discourse articulated through those lessons. At their own risk, they substitute the lesson plans and materials with others, transmitting the anti-war knowledge based on the discourses they support (Мне такие предатели не нужны, 2023).

The role of modes is especially important in education. As it was discussed in the previous sub-chapter, the choices made in practice can influence and change already existing discourse. Translating this stance into the domain of education would mean that the choices made by the educator would influence the knowledge created by the student – an idea supported by other researchers (Laurillard, 2012; Danielsson, 2016). Different modes have different cultural and material affordances. Some of them may be realised in certain materials and contexts, while others may not. Furthermore, some modes can be enhanced or diminished by other modes present in the communicative situation and the information transferred through them may differ. The combination of modes for certain purposes is called a multimodal ensemble (Kress, 2010). The multimodal ensembles vary from subject to subject due to the specificity of the content of each. In musical education, the main role in the ensemble would be

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<sup>3</sup> Разговоры о важном

assigned to the mode of music, whereas in arts, the mode of image would take a leading place. Although, some people may argue that in both examples, educators would still make a great deal of using the mode of spoken or written language, which brings us to the notion of a valued mode (Danielsson, 2016). In certain communicative practices, some modes are traditionally more highly valued than others. Kristina Danielsson brings up the example of writing in education and its importance in teaching and evaluation processes (*Ibid*). It can be extended that the valued modes are also subject-dependent to a certain degree. One may assume that spoken language is a great asset while painting training, however, if the training lacks the mode of image, the overall results of such education may be hindered. Therefore, there are two aspects which play a role in the choice of mode in the field of education – the affordances of a mode and its value. The former is connected with media and is understood as an ability of a mode to express the knowledge necessary for a specific subject. The latter deals more with societal and cultural values.

So far, I have focused on the articulation of education as texts. Nevertheless, interpretation is an essential part of the communicative act and is not to be overlooked. As it was established above, the design in education happens on two levels, so it is viable to suppose that readers' design of meaning may happen on two levels as well. Students may have very different abilities to influence the level of curriculum, which depends on the type of their education. In the case of state-funded education, however, the degree of influence is very limited and varies from country to country. In some places students may choose certain subjects they want to have in their curriculum, in others the curriculum is very rigid and not to be changed. As an example of the first one, one can think of a system currently used at the semiotics department of the University of Tartu, where a student has a right to choose optional courses according to their interest and an opportunity to vary the time when to pass certain courses. To illustrate the latter, one can have a glance into the Moscow State Linguistic University, where, like at most state universities in Russia, the curriculum is predefined and cannot be changed at all. However, even while possessing very limited abilities to influence the original curriculum, students can still redesign it according to their needs. As Kress points out, readers' interests influence "the manner of their engagement" (Kress, 2010: 38). Therefore, the redesign in case of limited opportunities, may not include the official changes in the schedule. By just paying more attention to one subject than to another, a student redesigns the content of the program, which was created for them. Accordingly, interest and attention may add up to redesign on the interpretation level as well. A lesson redesigned by a diligent student may

contain slightly different content than the one redesigned by a student not interested in the subject and paying more attention to the issues of personal character. Furthermore, the medium used in learning can influence the readers' design too. In some mediums, the usage of certain modes is constrained, which may influence the interpretation of the readers' articulation. Different modes can be carried out in different media, and if one mode, especially a valued mode, cannot be carried out in the medium chosen for the lesson, it may be assumed that the redesign of the students can be affected. The music lesson, conducted in the classroom with the instrumental accompaniment, would most probably be reshaped by the students differently from the same lesson written down on paper.

After a lesson had been thoroughly, or somewhat thoroughly, designed by a teacher, the time comes for the articulation part. Traditionally, the production of the lessons was carried out in special educational institutions. Therefore, the distribution of the lesson was limited to the here-and-now of the classroom. The situation has changed ever since digital technologies came into our lives and settled there. They have brought new distributional material resources as well as new contexts for education. However, let me proceed at a more orderly and slower pace.

The articulation of the content is virtually impossible without media. As it was mentioned in this chapter on pages 17-18, the modes used in education differ according to the subject specificities. So do the media. Therefore, the choice of media will also depend on their affordances and value. It may be quite challenging, although not completely impossible, to convey the order of strokes in a Chinese character using only non-speech sounds, like music. A task which is more easily performed with the help of a pen and paper. That is due to the nature of writing which is not translatable into sounds. Furthermore, the actual physical availability of media should be considered by educators. Some schools may afford projectors, touch-screen boards and tablets, whereas others do not have as many resources. Modern pedagogy pays a lot of attention to the technological advancements and their usage in practice. However, it is not to be forgotten, that not in all the parts of the world are those advancements available yet. One of the many issues for a young Chinese teacher I have talked to, (the name is not mentioned by her request) who had been doing an internship in a remote mountain region of China, was the lack of a whiteboard and any computer in a school, since most of the pedagogical techniques she had learned required the abovementioned tools.

There is yet one more peculiarity of media in education. When production is carried out in an actual physical classroom, the media are usually used as tools. Unless the virtual reality

technology is in question, in which case we have a slightly different situation. When there is a shift to another type of distribution, the situation changes. As it was mentioned by Kress and van Leeuwen (2001: 89), some distributional media result in the reduction of multimodality. The context, or the aura if you wish, becomes different. Hence, with another distribution of the educational content, the importance of media for the context increases, compared to the traditional classroom.

Summing up what I discussed in this sub-chapter, the education as perceived in the multimodal communication framework has certain peculiarities. On the stratum of design, two sublevels can be established – curriculum design level and lesson design level. Moreover, there is an instance of redesign, which affects the interpretation of the educational text. On the articulation levels, media can be used as tools as well as can change the overall context of the educational text.

## **2. Digital online media affordances and constraints in formal education**

Digital media has already been mentioned multiple times in the text so far. Now it is time to address and explore them in more detail. It should be mentioned that it is virtually impossible to cover all the peculiarities of digital media influence. They interact with every communicational stratum and affect them to a great degree. With that said, I will proceed, starting with the elaboration on what digital media are and continuing with communicative affordances and constraints of digital online media in formal education.

Nowadays, the term “digital technologies” unites myriads of different media. To put it very simply, digital technologies are those that use digits to codify information, save it, maybe, process it and transfer it further. Of course, it is a great simplification of a process called digitization (Balbi, Magaudda, 2018). However, technological details are not of main importance in order to analyse the influence of digital media on education. What is quite more essential for my further analysis, is the fact that digital technologies have allowed people to store more information and transfer it more quickly (*Ibid*). Therefore, at the dawn of the digital era, technologies were used mostly for distribution. That is not to say that early digital technology did not possess the capability for production. Quite the contrary, it is a known fact that the first computers, also known as punch-card machines, were used to produce simple mathematical calculations. However, with the development of machines, the aspect of sharing information between computers rose. It may be argued that it has even spiked up with the creation of the Internet and digital media expanding into digital online media. Digital online media are precisely to be in focus of my work. They are to be understood as digital media requiring online connection for their functioning.

Nevertheless, let me leave the history of digital technologies for the professionals and move on to the discussion of how they have influenced distribution of formal education. As it was mentioned in the chapter 2, distribution is a spectrum. With time, distributive media tend to move away from mere transcription to origination. They become an essential part of the expression, shaping it to an extent. To illustrate that, I would like you to consider two different types of lessons. Both of them are conducted online. The first one features a teacher in a classroom who has a camera in front of them and conducts a lesson in the same way they would if the students were present in the classroom. The second one, however, makes use of special software providing online live quizzes for the students embedded in the videoconference tool. In the first example, we can see digital online media being more of a reproducer of a traditional classroom, whereas, in the second one, the medium expands in the direction of origination. In Bolter and Grusin's (1999) framework, the second example aims to refashion the older medium for the new needs, whereas the first one represents the older medium in a new way. In other words, when digital online media are used for transcription of the lessons, the educational situation is reduced since there is a lack of some modes; whereas being used as a tool of synthesis, media transform the educational situation by providing itself as a new mode with new material tools to be used. This shift, however, requires technological development as well as participants' awareness about it.

No matter where on a spectrum an educational text stands, it is going to face some constraints from the transportation into the digital world. However, focusing on just one gloomy side of the question would be quite unobjective and pessimistic. Digital online media do bring some affordances too. They have become so widespread in our lives for a reason, after all. Below I am going to provide a brief overview of those affordances and constraints, starting from the possibilities provided by technological development and moving on to the obstacles which have not been overcome yet.

When we think about what have digital online media given us, one of the most evident advantages is the opportunity to be elsewhere. Namely, spatial affordance. It is precisely what made digital online technologies the sovereign of our lives, so to speak, during COVID-19. The spatial affordance of digital media provides access to the educational process for students independently of their physical presence. Of course, certain limitations, such as internet access, should be considered, since there is still about one-third of the world, that is not connected to the global online network (Petrosyan, 2023). Nevertheless, spatial affordances of digital online

media can be perceived as a huge advantage for certain groups of students, such as part-time students, physically challenged students, international students etc.

Another affordance provided by digital online media is temporal. Students do not need to be tied to a certain time of the lesson anymore. Due to the fact that digital online technologies offer means of recording and redistributing the content, people can engage in the educational process with a certain time delay or at their own schedule. A lot of different online educational platforms, such as Coursera or edX, take advantage of precisely this affordance. Temporal flexibility allows people with a higher time occupation to be engaged in the educational process. The use of temporal affordance can be met at the level of the university education too. For example, in the autumn semester of 2022-2023<sup>4</sup>, Aarhus University provided a course on the General Data Protection Regulation, which is a prerequisite for certain subjects, like, Experimental Psycholinguistics. This course consists of texts and videos, which can be followed at any time throughout a semester, which leaves more space for students' time flexibility.

Finally, before moving on to the constraints that digital media imposes on education, I should discuss one implicit but important affordance of digital media implication in education. It is media and transmedia literacy. With the development of new technologies and their rapid implementation in various spheres of our lives, a necessity for the development of skills for their usage has arisen. Moreover, it is not only certain technological knowledge that has become essential but also the knowledge around under what circumstances to use it. Media literacy concentrates precisely on that. In her work, Sonia Livingstone (2004) focuses on four points of media literacy coming from the traditional definition of literacy overall – access, analysis, evaluation and creation, i.e., a media literate person should be able to access, analyse and evaluate media as well as create products with it. The usage of digital online technologies in the educational process contributes to the development of these abilities since digital online media become an essential part of the lesson. Another notion of transmedia literacy is somewhat different and was developed quite recently. If media literacy focuses more on consumption and how to consume media products consciously, transmedia literacy shifts the focus on how to consume and create consciously across different media (Scolari, 2018). Here, once again, we can hear the echoes of digital media transformation into a mode of its own. The development

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<sup>4</sup> The course is still available, however, the author does not possess information about it being an obligatory condition for any courses.

of transmedia skills requires more than just a simple shift of the educational process to another medium. It needs the involvement of different media, including informal, which can be met in certain educational establishments. For example, some professors at Aarhus University use Rocket.chat and Slack! programs in order to perform certain tasks during the lessons as well as enhance communication between the students. The notion of literacy, however, is perceived as problematic in the multimodal framework, where all the communicators are literate by definition, since they are capable of producing signs (Kress, 2010: 65). I believe that in this case it is viable to perceive literacy as a spectrum too, where on one side there is a capability of producing signs, and on another one – capability of producing signs in the conscious awareness of the process.

Nevertheless, with new opportunities come new challenges, and although people gain a particular amount of freedom when using certain technological developments, there are still some drawbacks to consider. To begin with, one should remember that in digital online media, some modes can be reduced and some can be changed. As it was discussed in the previous chapter, the reduction and alteration of modes, which happen when the distributive media change, lead to changes in context. Arguably, one of the most important changes in digitalized communication involves the spatial and temporal aspects of communication. The very things that make studying online so convenient for some, can also be perceived as a potential problem. As it is mentioned in the article by Jones, Chik and Hafner: “They [digital online technologies] have altered our experience of the spatial and temporal aspects of context by creating complex ‘layerings’ of online and offline spaces” (2017: 9). That influences communication between the participants of the educational process to a certain extent. According to Nissenbaum, who worked on the notion of privacy through the context, contexts provide special context-specific norms which regulate communication. In certain contexts, certain norms are used and participants play out corresponding roles. This process creates contextual integrity (Nissenbaum, 2009). In other words, contextual integrity is a compliance between the context and context-related norms. However, the layering of contexts in the digital world influences the process and “makes it much more difficult to maintain contextual integrity” (Jones, Chick, Hafner, 2017: 9). Although the term of contextual integrity is associated mainly with privacy, the context interplay, described here, has a very important influence on education as well. When a traditional classroom is moved to a screen, and a student can participate in a lesson from the comfort of their bed, the traditional contextual norms of a lesson are no longer relevant. They are diluted with the norms, applied at home. Why wear smart casual clothes when it is possible



not to turn the camera and attend the lesson in pyjamas? It can be further speculated that this context interchange may cause the ‘zoom fatigue’ in teachers and students. Since contextual interplay makes communication more complex, it may lead to an increase in cognitive load. Nevertheless, this statement is currently an unproven assumption based on deductive reasoning, which requires further experimental verification. What stays, however, clear is that contextual interplay is one of the obstacles to overcome when articulating an educational text using digital online media.

The second constraint to examine, which was briefly mentioned above, is sensorial. Every medium has its own peculiar sensorial channel. It was claimed that this can even be a distinguishing factor between different media. Roland Posner stated: “two sign processes belong to the same medium when, in their reception, *they either rely on the same sensory apparatus [...], or utilize the same contact manner [...], or operate with similarly functioning instruments [...], or occur in the same type of social institution [...], or serve the same purpose [...], or use the same code [...]*” (Posner, 2004: 60, my italics). As it can be seen, he also devoted an important role to the context in media classification. However, as digital media come with a multi-layered contextual situation, it seems that resorting to the context factors will not be sufficient. Arguably, the main sensorial input in digital medium comes from the screen, which leads to focusing on the visual affordances of the medium the most (Fadeev, Milyakina, 2021). Besides that, digital online media quite often provide vast audial affordances. The sensorial apparatuses, which currently are not widely used in commonly available digital media, are olfactory and gustatory, with tactile being involved insofar as it is required for the interaction with digital technologies. Although there are some local applications, like smell-o-vision, which later evolved into 4D and 5D cinemas, they are not common.

What is important to take into account is the fact that even the affordances provided by digital online media can be constrained. To make it clearer, let us imagine a situation where a student is engaged in an online lecture on a subject they have a very low motivation to learn. The lecture is conducted in an open-source software Big Blue Button, where the student has an option not to turn on the camera. Furthermore, let us imagine that the lecture is conducted at 8 in the morning, and the student struggles to perform to their best functionality. Therefore, he/she decides to turn off the sound and collect some more energy via sleeping. Here one can see how the initial audial and visual affordances are constrained by the participant in the communicative

process, which may lead to unfortunate results of the student missing out on some important information necessary for knowledge construction.

The last constraint in question is coordination. However, to delineate the borders of this issue, I need to turn for help from social interaction processes and cognitive research in this area. More precisely, to sense-making in social interaction processes. Kress and van Leeuwen (2001) do not provide a certain clear-cut definition for communication or communicative act, but from their writing, it is possible to establish certain features of communication: 1. There are the author of the text and the interpreter; 2. there are two processes that happen between them – articulation and interpretation; 3. Four different communicational strata participate in communication, however, not all of them may be present in each communicative act. The definition of social interaction focuses more on the autonomy of the participants. I am going to employ the one that comes from the work of De Jaegher and Di Paolo:

“Social interaction is the regulated coupling between at least two autonomous agents, where the regulation is aimed at aspects of the coupling itself so that it constitutes an emergent autonomous organization in the domain of relational dynamics, without destroying in the process the autonomy of the agents involved (though the latter’s scope can be augmented or reduced)” (De Jaegher, Di Paolo, 2007: 493).

It is important to realise that autonomous agents here do not mean humans, they can be any subjects of any nature, such as animals, insofar they preserve their autonomy as an ability to “generate and sustain an identity under precarious conditions” (*Ibid*, 487). Furthermore, coupling in social interaction means the process of reciprocal exchange between subjects. Therefore, there are points in this framework similar to the ones we find in the text of Kress and van Leeuwen (2001). It may be argued, that not all communication is social interaction, and I will not contradict this argument here. What is more significant is that social interaction is communication. Furthermore, the educational process is social interaction. An educator and a student are autonomous entities, involved in an educational process, which becomes an autonomous organization of itself. Therefore, whatever is relevant for social interactions may be relevant to educational communicative acts, including ones performed through digital media.

There is one point I would like to focus attention on in the abovementioned social interaction definition, and that is the regulation of the aspects of coupling. It is relational and depends on coordination. By coordination De Jaegher and Di Paolo mean “non-accidental correlation between the behaviours of two or more systems that are in sustained coupling, or have been coupled in the past, or have been coupled to another, common, system” (2007: 490).

This correlation does not have to be absolute in order for a social interaction to exist. It may be relative. In other words, alignment or imitation, as the absolute correlation of certain instances, are not necessary, although can occur, for a meaningful social interaction. Moreover, coordination is in a dialectical relationship with interaction itself – it influences the unfolding of the interaction, but interaction in its turn influences “the likelihood to coordinate” (*Ibid*, 492). Therefore, the historical component, namely historicity, plays an important role in the interaction. Furthermore, coordination and breakdowns in it affect the process of sense-making within the interaction (*Ibid*). This means that the temporal aspect of communication is important for a meaningful educational communicative act. Besides different degrees of coordination within an interaction, there are also different levels of coordination among the participants. They can coordinate on the linguistic level (Pickering, Garrod, 2004) as well as on the paralinguistic (Nasir et al., 2018), the level of bodily movements (Louwerse et al., 2012) and the level of facial expressions (Ramseyer, Tschacher, 2014).

When one thinks about coordination in online social interactions, inevitably some concerns may arise. Coordination depends on under what circumstances the interaction unfolds – context. In the case of online education, as we have already discussed above, the traditional contextual norms are transformed, therefore it can affect coordination too. It may be argued that almost everyone has struggled to answer some questions of a partner while having problems with the Internet connection – linguistic coordination certainly becomes less efficient under those circumstances. And that is only one of the levels. Nevertheless, this is a very specific case, and if we think about a normal or ideal situation, those problems should not arise. But does this mean that coordination in online communication, then, would stay the same as in a traditional setting? Not exactly. As we remember, our choice of media leads to the limitation of senses we can use. Moreover, when a text is distributed via different media, mode reduction arises. These aspects do affect coordination, and there are various studies confirming changes in coordination in online communication. For example, a group of scientists from the University of Warsaw established that the stability of interpersonal movement coordination in online settings was decreased compared to face-to-face settings (Zubek et al., 2022). They conducted an experiment with four conditions: remote communication with a mirror image – an image of the speaker themselves, remote communication without a mirror image – participants could see only their counterparts, face-to-face communication with a mirror image, face-to-face communication without a mirror image. Conditions were realised in the form of dyads. Each dyad was formed out of two groups of three, in a way that every participant was paired up with

two others. Every dyad was exposed to all four conditions, participating in one remote and one face-to-face conversation, which were divided into two parts – with and without mirror image. The conversations were spontaneous and not limited by any topic. All the conversations were recorded, and the participants' movements were later tracked via coordinates of two points – the tip of the nose and the middle of the torso. After that, hypotheses concerned with interpersonal coordination, specifically that coordination in face-to-face conditions is more stable and prolonged, and that coordination in mirror image conditions is less stable, were operationalized in three measures. These measures were calculated for each dyad and resulted in 48 data points, from which only 44 were used due to the high number of missing values in two dyads. The data points were analysed using “the methodology inspired by multidimensional cross-recurrence quantification analysis” (Zubek et al., 2022: 8). As a result, the first hypothesis about interpersonal coordination was confirmed and proved that coordination in face-to-face conditions is more stable and prolonged. At the same time, there was no significant statistical data proving that coordination is disrupted in the mirror image conditions, hence it was disproved.

As to linguistic coordination, it proved to be task and language dependent. In 2019, Michel and Cappellini conducted research on linguistic alignment, lexical and structural alignment<sup>5</sup> precisely, in two conditions of remote communication – videoconference and chat (Michel, Cappellini, 2019). The videoconference condition was carried out as a teletandem conversation between French and Chinese students taking turns in speaking French and Chinese, hence changing from their native to the second language. The text condition was carried out in Skype chat among the UK students learning the German language as a communication with language peers or German tutor. The video data was later transcribed, and the chat data was corrected. After that the data was coded and measures were established, using the previous research. It was established that instances of lexical alignment are less frequent in online videoconference compared to text chat, and there was more alignment in conversations conducted in Chinese than in French (Michel, Cappellini, 2019). Structural alignment also proved to be task-dependent, as well as more common for the widely used structures. The research in question was focused on alignment for non-native speakers, hence, the offline condition was not of great importance. Nevertheless, this work illustrates that alignment, which

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<sup>5</sup> “the tendency for interlocutors to reuse a structure they have experienced in recent discourse through comprehension or production, as opposed to an alternative structure which expresses the same meaning” (Dao, Trofimovich, Kennedy, 2018: 294)

is a type of coordination, is dependent on the medium of communication. Therefore, it is viable to suppose that linguistic coordination in face-to-face conditions may differ.

Moreover, coordination is influenced by the transition times of communication, which is affected when a communicative act is relocated online. A group of researchers from the University of Michigan conducted two experiments, inquiring into the conversation rhythm in online communication in Zoom software (Boland et al., 2022). The first experiment was conducted online with two conditions – local and remote. In remote condition, participants were answering predictable and unpredictable yes or no questions to an experimenter, who was showing slides via Zoom. In the local condition, participants watched the presentation from their own computers and answered the experimenter via Zoom. A significantly longer response time was established for the remote condition. The authors indicated that this effect may be connected with the “increased difficulty planning the content of one’s response” (Boland et al., 2022: 1276). The second experiment was also conducted with two conditions – online via Zoom and face-to-face communication. The experiment consisted of approximately 10 minutes long conversations between the participants offline and online. Topics of the conversations were limited to pop culture and life in a local town. All the conversations were recorded, and, later, coded for a number of measures, including duration and transition time. It was established that turn transitions were longer in the remote condition as well as the number of turn pairs. Transition times in both experiments were way longer than the supposed audio transmission delay of the software. Authors suggested that the communicational transition time delay had something to do with the disruption of “automatic neural timing mechanisms (oscillators)”<sup>6</sup>, which may have been caused by the “variability of transmission delay” (Boland et al., 2022: 1279). Although this research lacks a wider look into different videoconference software, it does provide enough evidence to believe that coordination in online video communication may be affected by the medium where it is conducted.

Overall, in this chapter, I delineated the main affordances and constraints in production and distribution. In the following parts, I will focus on those applied to formal education online. More precisely, I will enquire into the contextual interplay constraint, the sensorial constraint and the coordination constraint, since those may have a vast influence on the meaning-making process in communication, as well as the success of a communicative act.

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<sup>6</sup> Specialized neural mechanisms for telling time in Oscillator-Based Models of motor timing (Paton, Buonomano, 2018)

### **3. Current methods for overcoming constraints – a case study**

Although some well-stated problems may already be half-solved, as the saying goes, another half of the way may be by no means any simpler than the delineation of the problem itself. In the present case, the determination of the constraints should be followed by the possible solutions for overcoming them. In order to do so, I need to answer one simple question first: What is being done with these constraints today? It would be redundant and quite disappointing to propose a solution which has been in use for quite some time already. Therefore, a glance into the current state of affairs seems necessary. In this chapter, I will try to do precisely so by carrying out a case study of a course conducted at the University of Tartu.

#### **3.1 Materials and Methods**

In order to establish the current methods used for overcoming constraints imposed by digital media, I will analyse the online course Zoosemiotics: Umwelt and Animal Communication, course code – FLSE.00.260. The permission to analyse the course was obtained via e-mail on 13 June 2023. This course is a part of the curriculum of the master's program in semiotics at the University of Tartu. Before the COVID-19 pandemic, this course was conducted fully on-site. The first launch of the online version of the course was provoked by the lockdown in the years 2020 and 2021. In the following years, the course was conducted in a hybrid form (2022) and fully on-site (2023) with an access to the online course in the Moodle learning management system for the students who could not be present offline. For example, students during exchange in another country. It is important to notice, that although the system is for the learning management, we do not analyse the subjective experience of each student

using it. This would be learning analysis, and would require learning evaluation procedures. I am analysing education conducted via the learning management system.

The courses were conducted in the year 2022 and 2023 used the videos recorded in the year 2021, which were shared through the proprietary software Panopto, embedded into Moodle. In the current analysis, we will focus on the exclusively online part of the course conducted in the year 2022 with the screenshot illustrations from the 2023 course, since access to the 2022 course was not granted. The onsite seminars will be completely omitted from the analysis since they consisted of the presentation of the text, chosen by the professor and the following discussion. Questions related to the lectures, which were conducted online, may had been asked. However, since there are no recordings of the seminars, unfortunately, we are forced to sacrifice this part of the analysis.

The course was chosen for the analysis for several reasons. Firstly, the course does not aim at developing specific skills which would require an offline presence of the student in the classroom. Which is not the case in, for example, traditional crafts, where online education requires extensive work to be translated on the screen (Pöldma, 2021). Secondly, the course was based on the on-site offline course, which may provide a glance at the specificities of remediation.

The main method to be used is multimodal discourse analysis (MDA). According to Jones (2013), there are two main directions in MDA – textual and interactional . Textual MDA is based on Halliday’s systemic functional linguistics and social semiotics. It analyses texts from the point of view of the framework provided by Kress and van Leeuwen. The interactional approach differs in its theoretical basis from the textual one and it

“has been more influenced by work in linguistic ethnography, anthropology, and psychiatry, especially the “ecological perspective” on communication developed by Schefflen, Birdwhistle, Bateson, and others working in the Palto Alto research group in the 1950s (see, e.g., Ruesch & Bateson 1951/1968; Birdwhistle, 1970; Scheffl en, 1974). It has also drawn heavily on work in conversation analysis and interactional sociolinguistics (see, e.g., Goodwin, 2000), “nonverbal communication” (see, e.g., Kendon, 1990; McNeill, 1992), and mediated discourse analysis as developed by Scollon and his colleagues.” (*Ibid*, 3993).

Generally speaking, according to Jones, the main difference between the two approaches is the focus of work. The textual approach focuses more on the text itself, how it is

created and mediated with some references to the overall context of communicative act, whereas the interactional approach analyses every text in its particular context. Nevertheless, this statement seems a little bit underestimating textual MDA, especially if we look into some cases provided by Kress and van Leeuwen (2001: 50) in their book, such as an elaborate example of teaching the concept of blood circulation. There are instances of the combination of those two approaches together mentioned by Jones. For example, Rick Iedema, who inquired into the influence of ongoing social interactions on the meaning of texts, and came up with a concept of resemiotization, which is a process of meaning transformation depending on the social context (Jones, 2013).

However, one claim by Bateman (Bateman et al., 2002), to which Jones refers, seems to be viable and uncontested. That is a claim about the lack of empirical evidence for the analytical principles developed within the textual approach. This is not to incriminate the approach and discard it whatsoever, but to underline the importance of the empirical research in this area and the cooperation with other scientific disciplines like cognitive studies or neurolinguistics. Moreover, that is to acknowledge my own limitations. The present research does not aim to conduct any empirical research of the matters in question, due to the time and resources limitation, optimistically hoping for such research to be carried out as a continuation of the current project.

Yet another limitation of my current work is the absence of context. Due to the fact that the social interaction within the course of 2022 was not recorded, and, hence, cannot be analysed, I cannot employ interactional MDA. Therefore, the approach I would lean toward is textual MDA, which also coincides with the main theoretical framework provided above. In the following part, I am going to analyse the course on four communicational strata, focusing mostly on design, production and distribution. As it was mentioned in chapter one, this work is aiming at analysing the articulation of the communicative constraints, hence the focus on the articulation strata. I am going to establish the main modes used during the course and their media expression – production and distribution. It is important to mention that quite often textual MDA is used to analyse and compare different modes in order to assess their role in the meaning creation or the peculiarities they bring to the communicative process. In the present research, I would also expand into modal embodiment in media in order to see how and to what degree contextual layerings, sensorial and coordination constraints were present and addressed. Unfortunately, quantitative analysis of constraints through codification was not carried out,



which has become yet another limitation for the present work, and, however, a soil for future research.

## 3.2 Analysis

### 3.2.1 Discourse

The course under the analysis was carried out at the University of Tartu, which attributes it to the discourse of scientific academic knowledge. Since Zoosemiotics is an interdisciplinary subject, the course included knowledge from the areas of semiotics, biology, zoology, ethology, behavioural ecology, sociobiology and comparative psychology. The students participating in the course were from different cultural backgrounds (the course of the year 2022 included the following – American, Brazilian, Croatian, Estonian, Russian and Ukrainian), therefore, the academic discourse of the interpreters slightly differed from the academic discourse of the author. According to Geert Hofstede's power distance index<sup>7</sup>, Russia is considered to be a country with a high distance between the subject and authority with the PDI of 93 (Hofstede, n.d.). At the same time, the Estonian PDI is 40. Consequently, there is a very fruitful soil for a discrepancy in discourse about the authority between a Russian student and an Estonian professor. Brazilian and Croatian PDI also differ quite significantly being of 69 and 73 accordingly (*Ibid*). There is no validated data on Ukrainian PDI, but the estimation shows 90 (*Ibid*). The only PDI close to the one of the lectures was of the USA being 40 (*Ibid*). Furthermore, students were from different academic backgrounds, with only one of them having a background in biology and other in media studies, philology, linguistics, literature studies, sociology and philosophy. However, most of the participants had taken courses on readings of Uexküll and biosemiotics semester before, which provided common grounds for understanding certain terms like umwelt, functional circle, ecologic and semiotic fitting and others. Therefore, the exclusion of the students was very limited. The absence of exclusion was also provided by the extensive explicatory materials from the lecturer. Furthermore, additional seminar texts provided extra information for understanding the materials of the lecture. The organization of

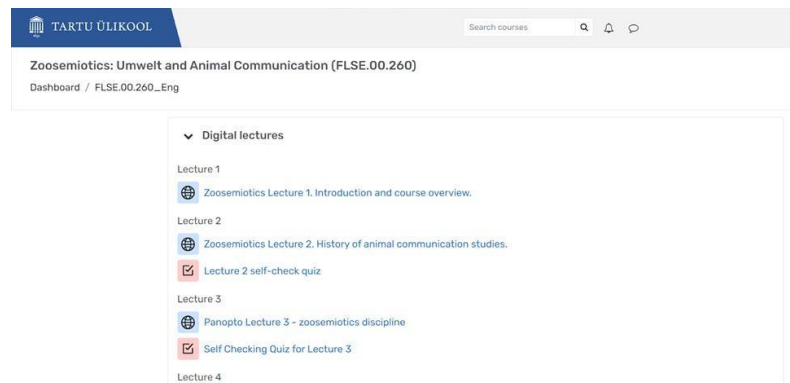
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<sup>7</sup> The power distance index is “the extent to which less powerful members of institutions and organizations within a country expect and accept that power is distributed unequally” (Hofstede et al., 2010, p. 61).

the discourse in terms of its design and articulation (production and distribution) is to be explored in more detail below in the corresponding sections.

### 3.2.2 Design

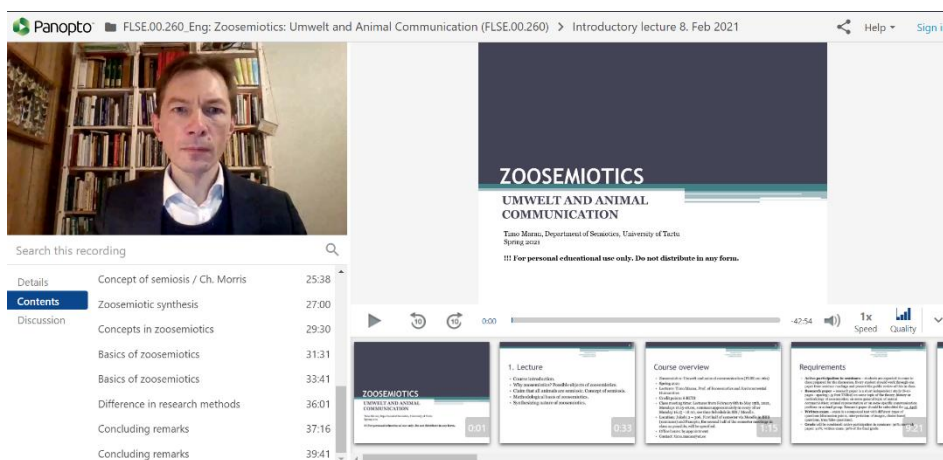
As it was mentioned earlier in chapter 3.1, the lectures were carried out and recorded with the help of the Panopto software. All the lectures were collected in the Moodle system in the form of links to Panopto (figure 1). After every lecture, except the introductory, a self-check quiz was presented. The quizzes consisted of true-false questions about the contents of the lecture, and the answer with a short commentary was provided after the student completed the quiz. The lecturer was both – rhetor and designer of the course.



**Figure 1. Screenshot of the Moodle management system’s digital material of the course “Zoosemiotics: Umwelt and Animal Communication” (Maran, 2021)**

As may be seen in Figure 2, in Panopto, the screen consisted of the video of the professor, the presentation and the contents of the recording on the left. Besides the content, a viewer had an opportunity to shift between the details of the lecture, discussion, notes and bookmarks. The latter two would become available after signing into the Panopto system and are not present in the screenshot. The viewer could also change between the slides which would correspond with the change in the video, as the latter would be taken to the moment when the slide was opened by the professor. The lecture contents in the left part of the screen

corresponded with the slides in the presentation. That is to say, by changing to another content item, the viewer would also change the presentation slide and the video timing.



**Figure 2. Screenshot of the introductory lecture of the course “Zoosemiotics: Umwelt and Animal Communication” (Maran, 2021)**

To identify what modes are in use, I will take upon the statement by Gunther Kress, mentioned in chapter 1.1, about the necessity of a mode to fulfill three communicational metafunctions – ideational, interpersonal and textual. According to this understanding, the most widely acknowledged modes would be the modes of written language, spoken language and image. There are multiple works done in analysing these modes, some of them by Kress and van Leeuwen themselves, and some by others, including research focusing on the modes in digital media (Tan, E, 2023). Nevertheless, I would like to draw upon some more or less novel modes, characteristic of the educational knowledge expression in digital online media.

Firstly, I would like to look into the presentation slides provided by the professor. At first glance, there is a great temptation to affiliate slides with the mode of images or a multimodal ensemble. Slides are limited by the frame, there are certain colours to them and elements of the slide should form a coherent composition in order for the slide to be comprehensible. At the same time, the mode of written language is more than often used in the slides. Furthermore, educational slides are usually accompanied by a verbal language explanation. All this makes the slides at least a multimodal ensemble, with the mode of image being a valued mode as defined by Danielsson (2016). However, I have not yet looked into whether the slides carry out the communicational functions of a mode. There is no doubt that the ideational function is fulfilled since the slides are used to express the content, dictated by

the discourse. Moreover, the slides, at least in the course under review, possess the characteristics of a text, having a beginning, an end and a coherent structure, consisting of different structural elements combined with each other (words and images). Finally, the slides in the online educational setting are used to facilitate communication between the lecturer and the student. They express the knowledge or opinion of the author, which is articulated to the students who process the information and may or may not engage in the discussion. This coincides with Halliday's understanding, who perceived interpersonal function as a mediation between personal thoughts and social interaction (Halliday, 1973). Nevertheless, it cannot be stated with complete confidence, as it has been noted, that students have a choice to be or not to be engaged. Therefore, the interpersonal function may be considered as fulfilled, if it sparks further communication between the lecturer and the student. In the case of the course under review, there was evidence of discussion for the year 2020, as comments posted on the video, which were available for the year 2022. There is no information on communication between the lecturer and students in the year 2021. The later course of 2022 had an opportunity to communicate their ideas about the presentation through the question box on the Moodle learning management system. For the year 2023, there was an opportunity to post comments in the discussion, however, there is no information on how widely it was used since most of the students were taking the offline course.

Secondly, I need to examine the video of the lecturer. The multimodal nature of videos overall is really hard to argue. They encompass such modes as image, spoken language, sounds, gestures, and occasionally, even more, if we think about VR or smell-o-vision. In the present case, the video includes mainly the modes of image, verbal language, sounds and gestures. However, they may also be perceived as structural elements being combined in one coherent whole, which would serve the purpose of the textual function. Furthermore, since the video in the educational context is a tool for knowledge articulation, it can be perceived as fulfilling the ideational function as well. As to the interpersonal function, I stumble upon the same issue as with the slides. Communication between the lecturer and the student is possible only through discussion tools. Hence, in cases where it is not prompted, the video could not perform the interpersonal function. However, in the case of the years 2020 and 2022, it is possible to see the fulfilment of this point.

Finally, I can turn to the self-check quizzes. They intended to explore the understanding of the topic by the students themselves and were not controlled by the professor. Therefore,

there is a purpose of stating the knowledge of the topic to the students, which may be seen as the fulfilment of both interpersonal and ideational functions. As in previous instances, the communication may have been unidirectional in case the discussion was not prompted. However, it may also be perceived as an ignition for autocommunication, as understood by Yuri Lotman (Лотман, 1973), where communication happens in the system ‘I’ – ‘I’ and is separated by time. It presents an interesting theoretical task to decide whether autocommunication can be a realization of Halliday’s interpersonal function. It seems most obvious that interpersonal requires at least two subjects of the communication process. However, as Lotman states, in cases when the information is communicated to one’s own self to fulfil a mnemonic function, the second ‘I’ is equalled to the third person, which makes a certain instance of autocommunication an instance of interpersonal communication, where both of subjects are the same person in a different time. The self-check questions, if not prompting communication with the teacher, are at least fulfilling the mnemonic function to remind students of certain instances of the lecture. Hence, the autocommunication, in this instance, should be perceived as fulfilling an interpersonal function. As to the textual function, the coherence of the quiz begs a question. The questions are connected by one topic but stay quite independent of each other. If we perceive them as structural elements, consisting of even smaller elements – words – the overall connection between these is weak, however, they are put under one topic. Furthermore, there is an overall variety of structural elements constituting self-check quizzes. They can be multiple-choice questions, fill-in-the-blank questions, matching, etc. An interesting illustration of the realization of this mode is iSLCOLLECTIVE – a website for English teachers where they can embed quizzes into videos. In those videos, the structural quiz elements are incorporated in certain places of the video and followed up by the answer and, sometimes, a short commentary. The tool for creating videos is available for any user of the website. Overall, self-check quizzes are considered a useful tool for the pedagogical design, including online formal education, since they promote revision and self-evaluation (Paturusi et al., 2015; Surip et al., 2021). Moreover, they are quite convenient in an online educational setting and are quite often used by online learning platforms such as edX or Coursera. However, self-check quizzes may raise concerns about selection as a semiotic action. Kress (2010) referred to it as a growing trend in a modern environment “ubiquitously augmented with information” (*Ibid*, 195). He saw its prevalence in representation, production and distribution (*Ibid*, 188). Nevertheless, if refer to a mnemonic function of autocommunication, it may be argued that selection in self-check quizzes does not hinder the process of construction and reconstruction of knowledge. According to Lotman

(Лютман, 1996), the root of qualitative change and additional information in autocommunication is the additional code due to the shift of context. Considering a variety of the structural elements of self-check quizzes, correspondence with the three meta-functions and the importance of the tool in digital learning, it may be useful to consider self-check quizzes as a mode in a digital educational setting.

### **3.2.3 Production and distribution**

As modes are inevitably related to media, it was not possible to avoid mentioning them before. Hence, I am not going to repeat ourselves by describing every instance of mode realization in media and move straight to discussing the specificities of how those modes were presented in media.

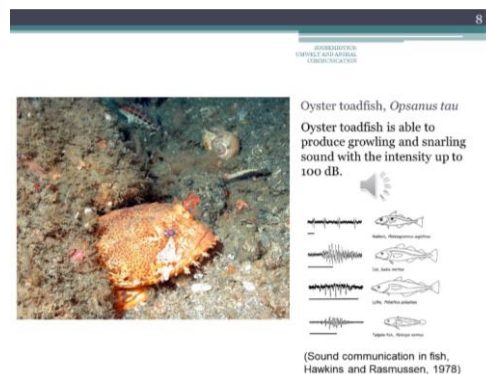
To start with, I have to look into the mode of natural language, both spoken and written. I do not aim to conduct a full linguistic analysis of the course, but I want to underline some features specific to the course under review. Both of the instances, spoken and written language, were present in the course. Spoken language mode was mediated by the professor exclusively since there was no possibility for students to engage in conversation in any other way except through written notes in the discussion. Therefore, a strict division between modes for the author and the receiver can be seen. The language used throughout the course was English, which was the native language only of some of the participants. However, a requirement of the master's program is to have a substantial knowledge of English, hence, all of the participants should have been able to understand the course. I propose that differences in language competences have caused some communicational discrepancies. The vocabulary available to people speaking on B2 level of English, which is the requirement for the program, and the vocabulary used by C1 users or natives, differ. Although there was not so many idiomatic expressions in the course, there is an abundance of academic vocabulary, synonyms, and specific terms which approximate the level of language in the course to C1, especially for the students who are not proficient in biology either.

The body language of the lecturer accompanying the spoken language was restricted by the frames of the video and, thus, limited to some hand gestures and facial expressions, which were not of a wide scope. I hypothesize that the lack of facial expressions is due to the context of the academic environment. The lack of bodily movements is explained by the restrictive limitations of video format which does not allow the movement possible in the offline setting. Furthermore, due to the absence of the image of students, bodily movements of the teacher could not be coordinated with theirs.

The mode of written language was also used to communicate meta-information about the lesson in contents and details tabs. It seems to be the most efficient way to mediate this content, since other modes, such as image or sound, would be problematic to use for this purpose in the current design of the course. The sound would interfere with the lecture, and, overall, sound is not a very common tool to denote tabs on online platforms. The image might be confusing due to the fact that the detail and contents might be mixed up with each other if represented by pictures, such as a small book, which may be used to denote both of them. In Moodle, written text can be divided into two groups – links and meta-text. Links were highlighted in blue colour, meta-text was represented in grey colour. There was no difference in the font, but there was some in size. For example, section headings were bigger than the lectures' headings, and the latter were bigger than the commentary. Therefore, links and headings were more salient due to the bright colour and size. Size variation is a widely used tool for drawing attention to the headings overall, if we look at different presentation templates offered by open-source PowerPoint template providers. In Panopto, the font and the colour were virtually the same, with the exception of the search tab, which had a slightly bigger font and lighter colour, the heading of the lecture at the top left part, which had a slightly bigger font and a sign-in link button, which was blue. I assume that due to the limited sensorial input available by the platform, different highlighting methods are used. The written language in the presentation will be analysed later as a part of the presentation mode.

The way mode of sound was represented deserves a separate glance at it. Due to the specificity of the course, some sounds should have been communicated to the students. For example, sounds of animals which are really hard to translate precisely in other media. In lecture 8 on communication in fish, amphibians and reptiles, there was a PowerPoint symbol for a sound or music embedded, but it was not used during the presentation (figure 3). Furthermore, in lecture 9 on communication in birds, there was a part about birds' vocalizations, but the

sounds were not presented for the students to listen to during the lecture. A similar situation can be seen in lecture 10 on communication in mammals. These instances may have been caused by a limitation of the study platform. Nevertheless, the links to the videos containing the sounds were posted in the forum for the students of the year 2022. In some instances, the lecturer mentioned that the links would be shared later (lecture 10), but in others, it did not happen. Hence, the mode of sound was mediated not in the lecture itself but as a part of extra information, along with self-check quizzes. The limitations of sound usage could lead to complications in understanding the material. At the same time, due to the fact that the course was pre-recorded, students had an opportunity to pause the lecture and get acknowledged with extra materials. It would not have been possible in a situation if the course had been conducted in real-time or offline. There would have been a time gap in between the information received and the example listened. Hence, the information listened in the first place could have been interpreted wrong, which would require further re-interpretation after looking up the example.

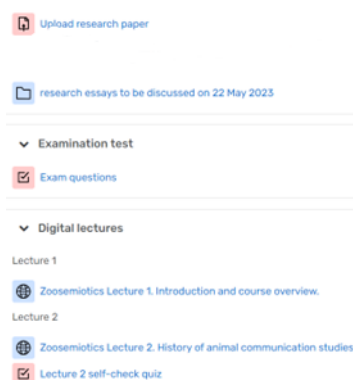


**Figure 3. Sound sign in lecture 8 of the course “Zoosemiotics: Umwelt and Animal Communication” (Maran, 2021)**

When talking about the mode of image, I am not going to analyse the instances where it is incorporated in other modes. But I can, however, look at Panopto as an instance of an image. As we can see in figure 2, the image consists of the lecturer, members, presentation, additional tabs, and an overarching episode of a lesson. Within the image, framing devices (Kress, van Leeuwen, 2006) are used to divide each section. There are borders between the lecturer, the presentation and the extra information. Furthermore, the image is subject to change, since the video and the presentation are not static. They are not static in terms of changes within themselves, as well as between themselves. Viewers had an opportunity to swop places of video and presentation on the screen. Therefore, the salience (*Ibid*, 177) of the elements was subject to change. Although, initially, the most salient element in the picture was always presentation,



since it was situated in the side of the screen taking the biggest part of it. Moreover, it had an opportunity to be put full-screen, unlike the lecturer’s slot. The left side was shared between the lecturer and the extra information. Therefore, it can be seen that in Panopto lessons are presentation-oriented, which leads to the backgrounding of the lecturer. If we refer to Gunther Kress’ (2010: 187) notion of convergence, we can see a possible explanation for that. When different media functions or different media converge, some of them may be backgrounded, which leads to the backgrounding of modes consequently. In the present case, different media representations of modes converged on one platform, which led to a greater focus on the presentation. Nevertheless, a certain freedom of choice was left for the student, which produced options for the re-design of the lecture. For example, students who had chosen the lecturer as their main focus would have missed information in the presentation. Furthermore, offline lessons are not necessarily presentation oriented. Notwithstanding the dynamic character of video and presentation, the overall composition and the places where the elements of the image are situated cannot change to a vast degree. Another instance of image mode can be seen on the main course page in Moodle. Every link on the page had a certain pictogram next to it, which denoted the category of the link (figure 4). Here, image played a supportive role. It still conveyed information but did not represent everything about the link. The extra information, important to understand where link leads to, was represented by written language. Therefore, the prevalence of the written language as the informational input over the image on the course page can be seen.



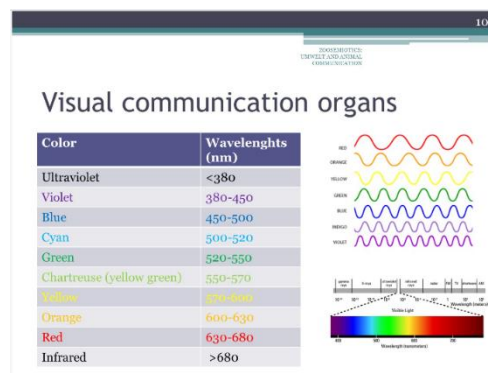
**Figure 4. Link pictograms of the course “Zoosemiotics: Umwelt and Animal Communication” (Maran, 2021)**

The video in the lecture was placed in the top left corner of the screen and shared its place with the presentation which is yet to be analysed. The videos were recorded, but not edited

to get rid of any possible speech slips. From the point of view of the composition, the lecturer was in the middle of the frame, with movements not exceeding outside of the frame, with the exception of some hand gestures. All the videos were recorded with a background of bookshelves and without any distractions. In all the videos, the lecturer was dressed in formal official clothing. The lectures were not interrupted by any interference from the outside. All this approximates the online video setting to the setting which could have been present offline. Let us imagine a lecturing video recorded with a kitchen as a background and the lecturer wearing informal clothing. One can assume that it would cause more contextual discrepancies since the contextual rules applied in a classroom and in an informal environment are different. The aspect of clothing, however, should be analysed in accordance to a certain lecturer, since there are no strict dress-code requirements from the university. The lecturer of the Zoosemiotics course stayed consistent with his clothing choice in both online and offline setting. Therefore, the combination of the background, clothing and the absence of outside interference is perceived as a way to overcome the contextual interplay between the informal setting and the classroom. The sound in the video was not recorded separately, but that did not influence the understandability of it. The sound was synchronized with the video, and since the lectures were pre-recorded no video glitches were present. The lecturer's speech was prosodically stable and did not include any outstanding deviations. The quality of the sound is an important point of analysis not only because it influences the comprehension of information. Radical deviation between sound of the voice online and offline may lead to another contextual discrepancy. Hence, I hypothesize that sound and prosody are yet two more tools of preserving the contextual integrity of the classroom while relocation to online. The analysis of each video separately is not to be conducted here, due to the lack of time and resources.

As could be seen before, the presentation consisted of two parts – slides and the content below, which could have been hidden (figure 2). The presentation template was the same throughout the course – white background with grey and dark cyan colour. The font stayed consistent throughout the presentation, being of a black colour Times New Roman for the main text, another non-identified font for the headings, and light turquoise for the name of the presentation at the top of every slide. The consistency of the presentation is perceived as a tool of consolidation of the lecturing material. Different templates would not create an obstacle for comprehension, but having consistency benefits the holistic perception of the course.

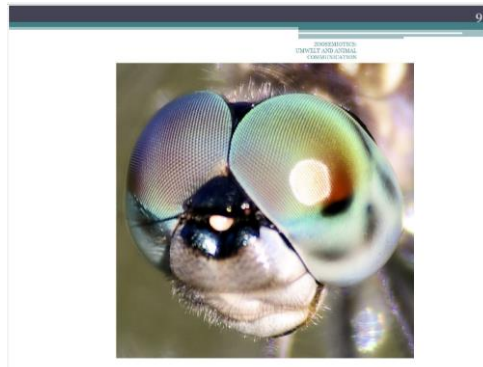
Different types of highlighting were used in the presentation. They included the following: bolder font, italics, different sizes (also used to denote citations), and different colours (light turquoise, violet, lilac, grey). Sometimes, more than one highlighting method were combined. Slight deviations in the meaning of highlighting can be noticed throughout the presentations. For example, in lecture 2, light turquoise and italics were used to denote a reference, but later in lecture 3, no italics were used. Nevertheless, certain highlighting types stay more or less consistent in all the presentations – light turquoise for quotes, violet for names of disciplines, bold for key points in the text. The highlighting methods of the presentation allowed better and easier navigation for the students. Since the main body of the text and a quote were well-distinguished, students could regulate what information to pay more attention to. Moreover, key points' highlighting grabbed the students' attention and led the focus to the main information of the slide, which left less space for the misunderstanding of the most important material. There was a special instance of colour highlighting, which should be mentioned. In lecture 6 on visual communication organs, a table on light wavelengths and corresponding colours was presented (figure 5). Each colour's name was highlighted in the colour it represented. I hypothesize that this provided a better understanding of the colour than just a name typed in black since the interpreters did not have to spend time remembering how those colours looked like. This could have been especially beneficial for non-native speakers with a lower level of language skills, because they did not have to refer to a dictionary trying to find the translation. It was not necessary since the name was explicated by the colour.



**Figure 5. Colour–wavelength table from lecture 4 of the course “Zoosemiotics: Umwelt and Animal Communication” (Maran, 2021)**

The length of the presentations varied according to the content, with the shortest presentation having 16 slides and the longest having 34. The number of slides did not seem to have an effect on the length, since the shortest presentation was in a lecture that lasted for 1 hour 20 minutes – almost the same amount of time as the lecture with the longest presentation of 34 slides, which took 1 hour 21 minutes. This effect can be explained by the illustrative character of some slides in order to show certain species.

Overall, three types of slides can be distinguished – textual, image and combined (text and image). By textual slides here I understand all the slides with no graphic information. It should be noticed, that textual information was not usually read out by the lecturer but served more as guidelines in his speech and notes for students. Image slides are the ones where the graphic information was present by itself (lecture 6) or with a heading or a reference, which was the more common case. Combined slides – are the slides that have both graphic and textual information, where textual information surpasses the limits of a heading. Such graphic images as schemas, tables or data plots were considered to belong to combined slides.



**Figure 6. Lecture 6, slide 9 of the course “Zoosemiotics: Umwelt and Animal Communication” (Maran, 2021)**

Textual and combined slides were prevalent, with purely image slides present only in 1st, 2nd, 4th, 6th, 9th, 11th and 12th. The maximum amount of image slides was 8 in lecture 9. However, most commonly, the amount of image slides was about 1 to 2 slides per presentation. The least amount of image or combined slides was noted in the introductory lecture – 7 combined and 1 image with an overall number of slides being 19. Since this lecture's aim was to provide an overview of the course and an introduction to the basics of semiotics, the necessity of illustrations was less. From here, I can infer that there was no focus on the image only. However, on most of the combined slides, image was more salient due to the size, although no

certain framing was present. Therefore, it can be inferred that image was an important element in the constitution of presentation, but mostly fulfilled illustrative function for the information represented by other elements, such as written language, or by other modes, such video-lecture.

Furthermore, a special instance of information on the slides should be noted. In some lectures, for example, 11th, the video information was needed. Nevertheless, like in the case of the mode of sound information, videos were not embedded in the presentation. Instead, links to videos were posted on the slides and later posted on a forum, at least in the case of the years 2020 and 2022. Therefore, it can be established that the mode of video was fulfilled only by the video-lecture, which in the present work, is perceived as a separate mode of its own.

Finally, I should analyse the media implementation of a self-check quiz mode. Self-check quizzes were available after each lecture in the Moodle management system. After choosing the quiz, a new browser window would open with the questions displayed. All the quizzes consisted of three statements, which the student had to deem true or false, by clicking on one of the options. Therefore, only one true-false type of question was used throughout the entirety of the self-check quizzes. Self-check quizzes were not limited in time. Thus, students were not forced to rush to answer and could use different study materials. While solving the quiz, there was an opportunity to flag a question in order to return to it later, if it's needed. Considering the nature of the questions, their amount and no time limitation, this feature seems to be redundant. However, it seems to be a standard feature of quizzes in Moodle. After submitting the quiz, a student would receive an instant feedback, showing the amount of right and wrong answers, providing a short commentary for the answers, and displaying the percentage as an overall result. Subsequently, a student had an opportunity to re-attempt the quiz. As it has been mentioned before, none of the results were communicated to the teacher. Therefore, this tool fails to support coordination between the teacher and the student. Nevertheless, as a tool of autocommunication, self-check quizzes can be considered successful, because students had an opportunity to revise their old notes, as well as their own memories. However, the usage of only one type of questions limited this opportunity. The students' autocommunicational dialogue was limited to certain topics, chosen by the lecture, and by the limited answers. Hence, there was a very limited space left for the students to create new inferences on the material. Nevertheless, if one thinks of the lecture notes as the lecturer's communicational input, the communication between student and the lecturer is still sustained. The short commentary after the answer also provides an instance of communication between

the participants of the act. However, these instances lack historicity of coordination. Hence, coordination fails to be sustained.

Insofar, I have examined 6 different modes – language, sound, image, video-lecture, presentation and self-check quizzes. The last three are perceived to be more characteristic of the online education process and their medial expressions. The modes were compatible in terms of translation and some of them incorporated others, such as presentation embedding language and image. An interesting instance of the intermodal translation was the sound, which presented the image of the sound in presentation, but did not produce the sound itself. Overall, analysis has provided some understanding of the current state of affairs with online formal education. Of course, for more representative research, more courses should be analysed, which is hoped to be done in the future. Furthermore, although some analytical points contain implicit information on communicational constraints in the course under review, I should explicitly point them out in an open discussion.

As it can be seen from the analysis, communication between the lecturer and students was mostly unidirectional. Since coordination is a sustained coupling of two interacting systems, a unidirectional way of communicating is an obstacle. The only instances when the communication was extended into bidirectional was the opportunity to post comments on forum and self-check quizzes. If the former instance provides support for coordination between participants, although with a certain temporal delay, the latter obstructs the historicity of communication and leads to the disruption of coordination. Nevertheless, it supports coordination insofar as an autocommunication tool, although with certain limitations described above. If to look further into the historical aspect of coordination feature, it can be seen that throughout the course it mostly pertained to the lecturer's narrative. If one imagines a student who, for whatever reason, was not watching the lectures chronologically, the historicity would be seriously hindered for them. Moreover, when the students did not take an active part in the communication process and did not introduce their part in the historical development of the communicative process, it was impossible for the lecturer to adjust coordination for the proper historical development and, hence, the proper unfolding of communication process itself. In order to address these issues, more communicative channels should be introduced into the course. It seems that they can be of an autocommunicative nature, too. It should, however, be pointed out that at least for the course of the year 2022, a field trip was organized, where students could implement their knowledge and fill in any communicational gaps which may

had arisen from the online course. Besides, the seminars were conducted in a hybrid form, with most of the students usually present offline (there was one student who took part online). As we discussed in Chapter 2, coordination is more efficient in offline settings, since there are no disruptions which are characteristic of digital online media. Therefore, the field trip and offline seminars can be perceived as tools to enhance coordination. Moreover, I suggest, that the real-time conversation between the lecturer and students benefited the historicity of the communication, otherwise hindered by the unidirectional nature of the course online. This happened due to the fact that the lecturer received instant feedback from the students during the seminars or the field trip, which he could further embed into the course using forums. Nevertheless, these tools are crossing the boundary of the digital online medium and cannot be implemented in the instance of fully online studies. Furthermore, the mode of self-check quizzes is also to be perceived as a tool supporting the contextual norms of a formal educational course. They do not only propagate autocommunication, but also can be viewed as a standard quiz, which may be conducted in a classroom in an oral or written form.

The typical sensorial constraints of the online process, such as olfactory, tactile or gustatory, could not hinder the delivery of the course, since they are not the main communicative information channels in the offline course as well. Some may argue that olfaction is an inseparable part of communication (Roberts et al, 2020). Insofar, its importance for the learning processes as an instance of communication has been proved in a mother-child relationship (Schaal et al., 2020), as well as mentioned in specific fields, such as traditional handicrafts (Pöldma, 2021). Therefore, a statement that olfaction is significant for formal education requires extra empirical research. Furthermore, it seems that tactile and gustatory senses may be vital in certain areas of formal training, such as medicine or cooking. However, in the present course, the usage of these channels seems to be only a nice addition, but not an essential part of the educational process. Other sensorial channels, namely visual and auditory, were present and widely used throughout the course. The usage of visual information for communication should be pointed out. Due to the nature of the digital online medium, a wide combination of different visual tools was used. A prevalence of the written language over the image was noted. Some instances of visual communication, such as the usage of different types of highlighting, especially in the case of the colour table in lecture 4, provided faster access to information for communicating to students. Of course, this statement may seem a little bit blunt without proper quantitative evidence from the students. Yet, it is viable to assume that this table has at least made the life of non-native English speakers easier since not everyone can imagine

what chartreuse colour looks like. Moreover, multiple research driven by the linguistic determinism hypothesis has looked into the colour perception by different language communities. It was proved that colour perception indeed is related to the language of the experiment's participants (Roberson, 2005). Therefore, using visual aids to provide some common ground for understanding the colours to the intercultural group of students seems to be a very useful method.

Since the videos of the lecturer were clear and without any visual impediments, there was no informational obstacles in modes based on visual sensorial channel. Furthermore, extensive visual illustrations were used. It is considered especially useful considering the fact that most of the students did not have a biological background. In case there was not any, extra information research would have taken extra resources of the students and affect their interpretations of the course. Overall, the presentation was the most salient mode on Panopto, underlining the importance of visual mode. At the same time, the use of visual input channels proved to be still more extensive than audial. If one thinks about mode of spoken language as an instance of audial input, there was little to no impediments in it. However, the usage of audial illustrative information was very limited. Since students had to inquire into it themselves after the lesson, the coherence of the lecture was affected. Besides, if one inquires into the auditory channels, as well as visual, from the point of view of students' production, they were not present in the course at all, which further disrupted coordination. Since the videos were pre-recorded, students could not produce an audial or visual input during the lecture. The only way to communicate was to write down a question in forum or contact the lecturer directly via e-mail. Apart from that, the lack of usage of auditory mode led to a greater focus on visual input only, which supported the sensorial constraint of online media. The strict division of modes and their respective sensorial channels between the participants of communication is considered to be an issue driven by the platform chosen for the course.

It should also be noted that the usage of visual information analysed in the course did not seem to differ from the usage of visual information in the classroom, with the exception of the video of the lecturer. This assists in maintaining contextual norms of the classroom. Although the mode of presentation is not unique to online education, its importance seems to be higher, considering the limitations of visual perception, such as a framed image of the lecturer, lack of the image of other students, etc.



Although we have already mentioned some inferences about the contextual interplay constraint, it still cannot be overviewed fully, since we do not possess information on how and under what circumstances the students participated in the course. This information is not easily retrievable due to the temporal factor of the research. The course was conducted more than a year prior to the present work. Hence it may be troublesome to recover the memories of all the students about how and where they watched every single lecture. Nonetheless, we can observe from the structure and realization of the course, that the lecturer tried to align with the contextual norms of a classroom. The usage of the official backgrounds and formal clothing were one of the tools in providing approximation to the norms of the actual Zoosemiotics classroom. Especially considering that the lecturers, as well as students, at the University of Tartu are not limited in terms of clothing. Yet, the lecturer stuck to the same style as during the lectures conducted in person. In case the lecturer wore less formal clothing, such as a robe or a loungewear, two different context layerings would interact and create a bigger contextual norms shift. Furthermore, sound and prosody are perceived as two more tools for overcoming contextual interplay constraint.

Finally, a few words should be said about the overall remediation of the offline course into an online digital setting. It is evident that it makes use of the older medium. For example, the lecturer's video, which aimed to recreate the presence of the teacher in the classroom, or the presentation, which was also used in offline media. However, there are also elements of refashioning the older media. The content of the whole presentation is available straight away, the video of the lecturer is optional and can be hidden by opening the presentation full-screen, the whole lecture can be paused, put on 2x or some parts of it can be skipped. There are two ways how we can interpret the reasons for that. First one, through the perception of it as new needs of the consumers – students. When you are studying online, the spatial affordance creates a necessity to adjust the timing of the lecture due to the outside circumstances. For example, a necessity to pause a video when you have to change spaces. Second way of explaining it is with gains and losses of the new media. Online digital media provides an opportunity to be anywhere any time, but with that comes a loss in continuity of the lecture process and occasional fragmentation due to the requirements of students. Overall, the case of remediation of offline Zoosemiotics course presents an example of mediating the older medium rather than attempt to incorporate it.

Overall, the course under review presents a comprehensive example of a remediation of a traditional classroom environment to an online form with a view of drawbacks. The course was well structured in terms of overcoming contextual interplay constraint. The tools which were used to overcome it include self-check quizzes, sound and prosody as well as presentation and approximation of the video environment such as background and lecturer's clothing. The sensorial constraint was dealt within the limits set by the platform. There is an inclination mostly towards visual modes and mode of written language prevailing other others, with audial being implemented only as a part of the video-lecture. The usage of sounds embedded into the presentation would provide a more extensive audial channel usage, simultaneously enhancing the lectures cohesion. Hence, the course would only gain from introducing more auditory communicative channels. Finally, the main impediment which should be addressed is the coordination constraint. Due to the unidirectional nature of communication in the course, coordination between the student and the lecturer is hard to sustain. The tools which were used in the course were limited to Moodle forums and self-check quizzes. Although, the latter tool was limited due to the unvaried nature of the questions. Introduction of more multidirectional communication channels is needed to sustain the historicity of coordination. Although there were implementations of offline activities which served this purpose, to shift to a completely online course an introduction of real-time online seminars seems to be an efficient solution. However, it would go beyond the current course and require more resources.

#### **4. Alternative methods in overcoming constraints and possibilities for their application**

The analysed case provides some ground from where I can talk about communicative constraints in online formal education and how to overcome them. Nevertheless, no case can be completely representative and display all the possible variants in dealing with the obstacles posed by the shift from the traditional classroom to digital media. In this chapter, I will try to elaborate on other possible options for dealing with the sensorial, contextual interplay and communicative constraints.

Starting from the sensorial inputs, it is evident from the conducted analysis that more than one channel should be used. Visual information can be very informative and facilitate our understanding. However, the usage of auditory communicative channels by both sides is no less important, partially because it also influences coordination. As to other communicative channels, namely gustatory, olfactory and tactile, their incorporation into the digital online education process requires certain technological developments or creativity from the side of the educator. The flavour of a cake can be translated into words, but it would lose a great part of its meaning. As well as, the structure of a metal, after it was processed, may be explained in a text, shown with the help of visual aids, but cannot be felt. It is for the professionals in these areas to decide to what extent is the gustatory or tactile information important. Nevertheless, in order to embed these communicative channels into formal online education, we need some great technological advancement that would allow smell-o-vision technologies to be used at home. Another option would be for educators to master the skill of translation and reference and make use of the tools available to most of people on a daily basis.

The contextual interplay constraint is a little bit harder to access in terms of alternative methods. The main problem is that contextual norms in different offline formal educational settings may vary. Some educational institutions offer lectures behind the desks, whereas others

prefer to conduct lessons in a more leisure environment or even outside, where students have an opportunity to relax and enjoy the nature. Some teachers prefer to keep a more informal communicational style with the students, whereas others keep a certain distance. There is no universal remedy in this case. Therefore, to overcome this constraint, a contextual background should be analysed by the educator in the process of course preparation. Analysing the student audience is a common procedure in different pedagogical approaches, such as instructional design, for example, where a teacher should analyse the students' learning environment and habits, their backgrounds and their necessities in order to proceed with learning objectives. There are different methods for the analysis, such as an open discussion or a questionnaire. It seems that bringing up some questions about the context of the education on the table would be a useful addition to the analysis. Nevertheless, it should be noted that approximating the contextual norms in which the educational information is articulated to students to the context of formal education is quite challenging and differs from one case to another.

As to coordination constraint, it can be approached from two sides – communicative channels and methodology. It was demonstrated in the analysis that lack of some communicative channels, or their usage only by one side of communicative process hinders communication. Hence, different sensorial channels should be available for both parties. It seems that this can also influence contextual interplay, since one peculiarity which is common in almost all offline formal educational processes is bidirectional communication. The opportunity for this bidirectional communication should be supported via visual or auditorial communicative channels. Furthermore, coordination may be supported with certain methodological orientations, such as triological learning approach proposed by Paavola and Hakkarainen (2009). This approach roots in the philosophical ideas of Peirce, the mediational theory of Vygotsky and the ideas of Latour. This approach stems from the earlier Paavola and Hakkarainen work on the metaphors of learning, where they proposed that besides monological and dialogical metaphors of learning put forward by Anna Sfard (1998) there is also a triological one, which focuses not only on the participants of the learning process and dialogue between them but also on the products they create collaboratively throughout the process (Paavola, Hakkarainen, 2005). According to them, the collaborative development of common objects, which influence the learning process as well as the participants, is essential for knowledge advancement. Later, this theoretical approach developed into a educational framework focused on the collaborative development of the epistemic objects, defined by Paavola and Hakkarainen

as “[artifacts and practices] that are given tangible (i.e., materially embodied) form in terms of writing, visualization, prototyping, or other means” (Paavola, Hakkarainen, 2021: 243). In the same article, the authors underlined that, as of now, the approach “is not a specific pedagogic model but rather a metalevel framework for identifying, examining, and fostering learning in line with the knowledge-creation metaphor of learning, going beyond mere individual knowledge acquisition or social participation” (Paavola, Hakkarainen, 2021: 249). Nevertheless, there are six design principles of dialogical knowledge approach which were developed by the authors and their collaborators. Their aims are to “point out characteristics that can be called “dialogical” and give broad guidelines for enhancing the dialogical features of the learning settings in question” (Paavola, Hakkarainen, 2021: 247). The design principles are:

“ DP1: Organizing activities around advancing shared objects.

DP2: Supporting the integration of personal and collective agency and work (through developing shared objects).

DP3: Fostering long-term processes of knowledge advancement with shared objects, whether artifacts or practices.

DP4: Emphasizing development and creativity in shared objects through transformations and reflection.

DP5: Promoting the cross-fertilization of various knowledge practices and artifacts across communities and institutions.

DP6: Providing flexible tools for developing artifacts and practices” (Paavola, Hakkarainen, 2021: 248).

In so far, these principles were used by different researchers to assess pedagogical practices in different educational institutions (Lakkala et al., 2012; Sansone et al., 2016). I believe, that implementation of these design principles in the actual instructional design may be beneficial for the online formal courses. The dialogical knowledge approach underlines collaborative development of shared objects, which promotes coordination between the participants, since they are involved in an instance of a joint-action. In pragmatic terms, this approach may be implemented with the help of such instruments as project management tools for groups, known as kanban boards, or mind-maps available for the students working on the common goal. It seems that a further research of dialogical learning approach implementation may benefit the research of communicative constraints in online education, as well as the

research of the dialogical learning approach itself, since to this moment it was mostly examined in the realm of computer-supported collaborative learning and not fully online learning.

## Conclusion

Whenever we remediate one instance into another medium, we gain something and we lose something. Digital online media are not an exception. They open a door to a lot of opportunities, but it is up to us what we make of them. It is especially true in the case of education. Nowadays it is not necessary to walk 1000 km in Mikhail Lomonosov's style<sup>8</sup> to gain access to education. It may be enough just to open your laptop and register for a course. But if it was all so good, there would not be rising numbers of research on online education, especially after 2020, when a majority of educational institutions were forced to move online. My work provided an overview of what is gained and lost throughout the transition to the digital online media, as well as addressed the communicative constraints problems which arise along the way.

Perceiving formal education through the lens of the multimodal approach allowed me to structure the meaning-making processes in education within four different communicational strata. It also provided a perspective on instructional design in formal education, where two design levels – curriculum and lesson – and redesign by students are taken into account. Furthermore, it helped to establish the different roles of media – as tools or as a context of communication, which was connected to the remediation process.

Combining multimodal research with time-tested cognitive and social research alongside the newer developments in cognitive studies allowed me to establish communicative affordances and constraints of digital online media in formal education. Digital online media affordances were mainly derived from the multimodal research and consisted of, but were not limited to, spatial, temporal and media/transmedia literacy affordances. Digital online media constraints were derived from the combination of multimodal, cognitive and social research

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<sup>8</sup> Mikhail Lomonosov, Russian scientist and writer, in 1730 walked from his hometown in the far north of Russia to Moscow, to be enrolled into Slavic Greek Latin academy.

and were displayed by sensorial constraint, coordination constraint and contextual interplay constraint.

Manifestation of the digital online media constraints and tools to overcome them was studied with the help of the case study of the course “Zoosemiotics: Umwelt and Animal Communication”. The coordination constraint proved to be the most problematic, due to the unidirectional nature of communication in the course. The online tools used to overcome it were self-check quizzes and Moodle forums, other tools expanded beyond the online realm of the course. The contextual interplay constraint was addressed with the help of self-check quizzes as well as, sound, prosody and approximation of the video background to the environment of a classroom. Sensorial inputs were limited to visual and audial, with a focus on the former, which goes in accordance with other research on the topic (Fadeev, Milyakina, 2021) and supports an idea of greater focus on visual input in online digital media. The presentation and written language were the most salient modes in the overall design of the course. There was a lack of usage of audial input, which was connected to the limitations of the platform. Nevertheless, this sensorial constraint was overcome with the help of forums, where links to sound recordings were provided. Since the courses were pre-recorded, students had an opportunity to stop and get acknowledged with the recordings. However, this solution could cause complications in real-time online lectures since students may have to re-interpret the material after listening to the recordings.

Finally, drawing upon the conducted analysis and other research, I discussed alternative ways of dealing with communicative constraints in formal online education. Those included technological developments as well as methodological implications. I believe that methodology should be of the main concern when remediating lessons to the online medium. Currently, developing a teaching methodology for online education seems to be one of the most topical issues to research. This is due to the fact that not every traditional methodology easily translates into a digital online medium. The work suggests, that developing a method based on the dialogical knowledge approach may be especially beneficial due to its focus on coordination not only between teacher and student but also with the epistemic object produced. This leads not just to a bidirectional but to a multidirectional shift in online education.

The present work should be continued in future. Additional research should be carried out making use of combined methods. As it was mentioned multiple times in the text, currently,



lack of empirical research is the main concern of the multimodal theory of communication. Furthermore, interdisciplinarity and pragmatic nature of education requires the employment of not only qualitative, but quantitative research too. After all, different discourses may shape education in different terms, but what matters in the end is how to make education accessible and practical for different people.

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## Kokkuvõte

Käesoleva töö eesmärk on uurida kommunikatiivseid piiranguid formaalses online-hariduses. Online-haridus muutus aktuaalseks teemaks pärast COVID-19 puhangut. Õpetajad ja õpilased üle kogu maailma olid sunnitud klassiruumist lahkuma ja arvuti ees istuma. Kuigi veebiõppele ülemineku kohta on olnud palju edukaid näiteid, nagu edX, Coursera ja erinevate õppeasutuste pakutavad erakursused, osutus massiline üleminek täielikult veebikesksele haridusele mõnevõrra tülikaks. Esile kerkisid erinevad tehnoloogilised ja psühholoogilised takistused, mis mõjutasid hariduse efektiivsust (Yeh, Tsai, 2022). Neid takistusi on varasemalt uuritud mitmest vaatenurgast (Anjum et al., 2020; Song-Arsa, 2020; Tartavulea et al., 2020; Çelik et al., 2023). Oma töös lähenesin online-hariduse takistustele multimodaalse kommunikatsiooni teooria vaatenurgast. Seetõttu oli minu uurimistöo **eesmärgiks** kaardistada hariduse kommunikatiivseid piiranguid, mis võivad tekkida digitaalsete online-meediumite kasutamisel, ning uurida võimalikke lahendusi. Seda tehes pidin vastama järgmistele **uurimusküsimustele**:

1. Kuidas digitaalses online-meediumis tekkinud kommunikatiivsed piirangud avalduvad ja kuidas neid lahendatakse praeguses online-hariduse praktikas?
2. Millised on võimalikud lahendused neile piirangutele peale juba olemasolevate lahenduste?

Eelnevatele küsimustele vastamiseks kasutan järgmisi **metoodikaid**: kirjanduse ülevaade ja juhtumiuuring multimodaalse diskursuse analüüsi abil. Minu uurimistöo **objektiks** on veebikursus “Zoosemiotics: Umwelt and Animal Communication” Moodle platvormil.

Esimeses peatükis tõin välja multimodaalse kommunikatsiooni teooria peamised teoreetilised eeldused ja vaatasin läbi nende rakendamise hariduses. Seejärel andsin ülevaate kommunikatsioonivõimalustest ja -piirangutest, mis võivad tekkida pärast veebipõhisele

haridusele üleminekut, tuginedes multimodaalsele ja kognitiivsele uurimistöole online-meediumitest. Seejärel viisin läbi zoosemiotika kursuse juhtumiuuringu, kasutades multimodaalset diskursuse analüüsi, et tuvastada „sensorete“, „koordinatsiooniliste“ ja „kontekstuaalsete“ takistuste ja nende ületamiseks kasutatud meetodite olemasolu. Kõige problemaatilisemaks osutus „koordinatsiooniline“ takistus kursuse suhtluse ühesuunalisuse tõttu. Selle ületamiseks kasutatud veebitööriistadeks olid enesekontrolli testid ja Moodle'i foorumid. Muud tööriistad laienesid kursuse veebipõhisest olemusest väljapoole. „Kontekstuaalset“ piirangut püüti lahendada nii enesekontrolli testide kui ka heli, prosoodia ja klassiruumi keskkonnale sarnaneva videotausta abil. Sensoorsed sisendid piirdusid visuaalse ja kuuldavaga, keskendudes esimesele, mis on kooskõlas teiste selleteemaliste uuringutega (Fadeev, Milyakina, 2021). Esitlus ja kirjutatud keel olid kõige olulisemad viisid kursuse üldises ülesehituses. Lõpetuseks tõin välja mõned meetodid takistuste ületamiseks lisaks analüüsis esitatutele, tuginedes teoreetilistele uuringutele, läbi viidud analüüsidele ja dialoogilisele teadmiste lähenemise raamistikule, mille on välja töötanud Paavola ja Hakkarainen (2005, 2009, 2021).

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A case study of “Zoosemiotics: Umwelt and Animal Communication” course”

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