Re-thinking the online distance instruction based on students’ feedback

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Abstract

During the covid-19 pandemic, schools at all levels were often closed and online distance instruction (ODI) was applied. The main objective of this research was to discover the main didactic features of online distance instruction; and based on the collected data to define didactic recommendations towards improving the quality of the process. Five hypotheses were set that evaluated students’ opinions in the areas of teachers’ support for learners within ODI, types of sources exploited within ODI, means used for practising and fixing new knowledge within ODI, assessment of learners’ performance within ODI, and students’ feedback on ODI. In total, 272 respondents from upper secondary and higher education institutions participated in the research. Each respondent described the process of online distance instruction in two courses they selected of 64: (1) in a course that they appreciated, liked, enjoyed, and considered efficient from the point of view of their learning; (2) in a course that caused them discomfort in learning, as it was conducted in a way that did not suit them, and their learning did not bring the expected learning outcomes. Data were collected via a questionnaire; Chí-square test, adjusted residuals, and t test for comparison of means were calculated. Before the research started, teachers were trained in online distance instruction. Therefore, we expected that they will be competent in designing online distance courses and the courses will follow didactic principles. The results discovered significant differences in the frequency of occurrence of observed features in courses that received positive feedback compared to those having negative evaluation. However, some exceptions were detected.

Keywords Online distance instruction · COVID-19 pandemic · Students’ feedback · Upper secondary school · Higher education · Didactic recommendations

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Introduction

More than two decades ago, the process of exploitation of information and communication technology (ICT) in education started. During the period, ICT provided a chance to change teaching and learning at all school levels. Furthermore, in recent years, smart technologies have penetrated all fields of human life, including education. Whereas ten years ago Crawford-Ferre and Wiest (2012) defined online education as a popular alternative to classroom instruction that provides educational opportunities to learners with geographic, time, health, and other constraints and with various learning preferences, since 2020, educational conditions have changed substantially. The covid-19 pandemic brought an immense challenge to education, and online instruction has become one of the most widely used expressions in the world. Global efforts to slow the spread of the pandemic resulted in the closure of schools at all levels. The process of instruction was transferred from real classrooms to the online environment and ICT contributed to the crucial change. Thus, education has been exposed to the biggest change running live. Around the world, there exist numerous definitions of basic terms connected to this field. Within this article, traditional (in-class, in-person, etc.) instruction is understood as lessons conducted by the teacher face-to-face to learners in a real classroom (IGI Glogal, 2022) compared to online distance instruction which means that learners are educated from other places than schools, usually from their homes, using (latest) devices and technologies (Nolasco, 2022). Blended learning, that is, a mixture of ‘book, pen, and paper’ approach and technology-enhanced methods are often applied in traditional lessons (Cambridge Dictionary, n.d.). Or/and, hybrid learning may be conducted, when some learners attend lessons, while the others (from various reasons) are not allowed to, and the teacher runs the lesson for both groups simultaneously (ViewSonic, 2021).

Online distance approaches were reflected in the process of instruction. There exist large amounts of research works dealing with this topic; those mentioned below examined students of medicine, nursing, health, or related study fields. Online distance instruction affected teachers’ and learners’ performance, in particular, the process of acquiring new knowledge (as researched, for example, by Lim et al., 2022; Chen et al., 2022; Alsuraihi, 2022), feelings and motivation during the learning (e.g., Quigley et al., 2022; Hadwin et al., 2022; Tan 2021), and also many other personal qualities and criteria made impact on the process (e.g., Limniou et al., 2021; Clark et al., 2021; He et al., 2022). Faced with the new situation, a question appears how the online distance process of instruction is built and conducted, in particular, whether, if running online distance, it arises from identical or different didactic principles compared to the face-to-face instruction, what the features are from the learners’ point of view that result in success in online distance instruction, and whether the process should, or not, be re-defined and re-thought. In other words, we need to know whether the didactic features differ from those applied in the face-to-face process. Consequently, taking this into account, the main objective of this article is to introduce results of the research
that monitors students’ opinions in online distance instruction. And, based on the collected data to define didactic recommendations towards improving the quality of the process.

**Literature review**

Instruction, that is, teaching and learning (carried out both face-to-face and online distance) is a teacher–learner complex process conducted within the educational environment towards acquiring new knowledge (Juva, 2001). This complexity of the process of online distance instruction is expected to be the main contribution of this research because as it will be seen in the literature review, most studies do not apply multicriterial approaches in this field.

To meet the complexity and collect maximum information about the process of online distance instruction, we applied the methodology designed by Faltynkova et al. (2021), who examined the process since the very beginning of the covid-19 pandemic. When designing and adjusting the questionnaire, they collected respondents’ opinions after each wave of restrictions. Based on the first-round experience, they proposed several criteria that described the process of online distance instruction. When finalized, the criteria focused mainly on motivation of teachers and learners, advice on how to study online, communication in online distance lessons, learning content acquisition and delivery, methods of practising and fixing new knowledge, assessment of learners’ performance, and students’ feedback on ODI. Respondents were also encouraged to express themselves in open-answer items. By June 2021, when the third wave finished, the data were collected three times, after each wave of covid-19 pandemic in the Czech Republic (that is, in June 2020, January 2021, June 2021), and analyzed according to the above-mentioned criteria (Faltynkova et al. 2021; Simonova et al. 2021a). This approach proves to be advantageous; it captures features that are substantial for successful online distance teaching and learning, as shown in practice. Then, such features can be highlighted in teacher training and consequently result in the improvement of teachers’ and learners’ skills.

For literature review, we made search in the world-recognized databases (Scopus, Web of Science) using the expression *online distance* as the main key word in combination with pairs of other key words: online distance AND teachers support, AND sources, AND study materials, AND practising, AND exercise, AND question, AND discussion, AND assessment, AND performance. Combinations of three key words and four key words were also used; however, hardly any reasonable and useful results were found. It means that there was no study applying a multicriterial approach using these key words. The publications found cannot be structured and presented in groups according to key words, but they appeared repeatedly with several key words. The search was refined for years 2021–2022. Primarily, we intend on the studies corresponding to our research sample and methodology, if available. However, the review findings found that numerous studies only addressed one or two features of online distance instruction; none of them concentrated on the topic from a complex point of view. In some cases, if criteria were similar to some extent, the age of the sample group did not fit to our research. As a result, in the review,
studies dealing with teaching English language, information technologies, or a medical course are preferably included, in combination with didactic features crucial for the process of instruction, mainly motivation, communication, the use of technology etc.

When starting any new activity, motivation and positive attitude are the necessary precondition for success. DeCoito and Estaiteyeh (2022) discussed teachers’ views and attitudes, success and challenges through the lens of technological, pedagogical, and content knowledge (TP(A)CK), as we did. They concluded that despite few successes, teachers faced a wide array of challenges that negatively affected their attitudes towards online distance teaching and that the support received did not match their needs and expectations. Even TP(A)CK was not enough to succeed in online distance instruction and to change their attitudes. Regarding the pedagogical technological content knowledge of teachers of English as a Foreign Language (EFL), the perception and awareness of online teaching was investigated by Meirovitz et al. (2022). The study deals with the question of whether EFL teachers who applied selected tools and applications in face-to-face lessons were able to conduct language lessons online distance. Teachers reported that those who had higher knowledge of technology, first, provided tutorials to other colleagues, and, second, had higher learner engagement and motivation in online classes. Not surprisingly, in conclusion, the study emphasizes the need for teacher education, mainly in new teaching methods and the use of new teaching aids, that is, ICT, smart applications etc. for online distance instruction.

It has been proven that the main change in learners’ life caused by online distance instruction was a lack of social contacts (Heidrich et al., 2022). Social distancing, mainly the reduced interaction among learners and among learners and teachers, had a strong impact on the process of learning. Negative emotions due to less social contact increased the learning stress. On the other hand, some learners felt positive emotions resulting from more freedom and autonomy. Similarly to previous studies, perspectives were presented and discussed on how learners could be supported during and after online distance instruction.

Online learning in the School of Computing, Edinburg Napier University, UK (Fabian et al., 2022), applies Moore’s Theory of Transactional Distance (Moore, 1997), which has a direct bearing on distance learning. It explains and quantifies the learning relationship between teacher and learner if there is a physical or temporal distance between them. The theory recognizes that the significant distance of distance learning is not time or place, but (1) communication—frequency, quality, (2) structure of the course—following didactic principles, and (3) learning autonomy of the learner. Within the study, two factors of the Technology Acceptance Model designed by Davis (1989) are under focus that make an impact on a learner’s decision to use the technology: perceived ease of use and perceived usefulness of the tools. If the use is easy and the tools are useful, the learner’s attitude to online distance learning is expected to be positive.

Online distance instruction was also used in medical staff preparation, in the university course of Psychology (Siah et al., 2022). Students felt a lack of motivation, limited teamwork, they missed learning opportunities, and their interactions decreased.
An analysis of learners’ attitudes toward distance education that used several criteria was conducted in Serbia (Stojkovic & Jelic, 2022). The analysis aimed to explore three fields: cognitive, motivational, and emotional. Similarly to our research, positive and negative aspects were detected in learners; however, it is difficult to compare them because the respondents attended the 5th-8th grades, that is, they were approximately 10–14 years old. Insufficient interaction between teachers and learners and lack of intrinsic motivation were considered a negative feature of online distance learning, while the availability and presentation of study materials through information technologies was the main strength.

The process of online distance instruction was also examined by Simonova et al. (2021a). Students’ opinions, in particular the advantages, disadvantages, and consequently the didactic recommendations arising from them, were described and commented on. The largest differences were detected in three areas: (1) home environment, mainly a quiet place for learning, equipment with a (smart) device; (2) teachers’ competency in online distance teaching, particularly time management, appropriate teaching methods, and communication; (3) technical support to the process (for example, from a school administrator, or a teacher). The general didactic principles and the ICT-supported instruction described below were implemented in online distance instruction. Reflecting this, the research answers the question whether the process should be re-defined and/or re-thought. The results provided by the research will introduce another approach to designing and conducting online distance courses.

**Theoretical background**

Within the theoretical background, two fields had a crucial impact on the process of instruction: (1) general didactic principles, and (2) changes that appeared after ICT had been implemented into the process of instruction.

**General didactic principles**

In the seventeenth century, Johann Amos Comenius, an international educator of Czech origin, devoted life-long strong efforts to making the process of learning easy, fast, and open to all learners. He defined didactic principles that contribute greatly to achieving this target (Comenius, 1964). Despite it happened centuries ago, they are still alive, and form the basis of the Czech education system (Act N. 242/2008 Coll., 2008). Throughout his life, Comenius aimed at fulfilling his own didactic motto *Omnes, omnia, omneno* [Everything to everyone through all available ways] (Comenius, 1948). He emphasized that the instruction should be natural, non-violent, and consistent with the learner’s mental development. He wanted children to understand the world; therefore, he introduced the world to them in a way they were capable to understand. To achieve this objective, he required, for example, an open access to learning for all children, and appealed to teachers to reflect the learner’s age and level of knowledge, when designing and conducting the process of instruction.
Learning should start with concrete items and facts previously known to learners, then, the structure of knowledge should be built in a systematic, continuous, step-by-step manner, and clear examples should be used to illustrate a new learning content. The main objective (purpose) of the whole process of instruction should be known to learners, they should be aware of their learning, and this should work as motivation to them. Then, the process of instruction results in the building of new, abstract knowledge developed in the learners. Within the process, learners’ active approach is necessary; it is closely related to solving real life tasks and problems. Then learners understand the importance of learning, the facts and processes that step-by-step help them form a reflection of the real world. After the long times, when new knowledge was acquired through memorizing without understanding, the didactic principles designed by Comenius in the seventeenth century were learner-centered, which was a substantial change. Using the current terminology, we can add that positive learning environment in the class and the support of the learner’s family contribute to the success of the learning process. If study materials are illustrative and teaching methods appropriate to the learners’ age and knowledge, then, the learners can acquire the learning content step-by-step, systematically so that they develop lifelong knowledge. As mentioned by Capkova (1970), *Omnia sponte fluant, absit violentia rebus* [Let everything flow freely, without a violent disruption], he required.

From the point of the latest developments in educational science, particularly in didactics, Comenius’ principles are generally accepted and parts of the included in many educational theories. In the past, they were considered revolutionary, but, they were also rejected. If applied appropriately, they have the potential to make the process of instruction smooth and natural, even if conducted online distance.

**ICT-supported instruction**

When ICT appeared and were exploited for educational purposes, logically, new requirements emerged for teachers’ competencies. Within a rather long period of history, content knowledge and pedagogical (didactic) skills created a minimum for successful teaching that time. Since the implementation of ICT into the process of instruction, the technological knowledge has also been required. Thus, the teacher’s competency was defined as the intersection of technological, pedagogical (and) content knowledge—TP(A)CK (Thompson & Mishra, 2007). General knowledge and skills in technology do not automatically result into efficient teaching, but teachers must be trained to use them (Gagne et al., 1992).

Smart technologies exploited in the process of instruction opened doors to changing the process substantially. In 2006, the SAMR (Substitution, Augmentation, Modification, Redefinition) model was designed by Puentedura (2006). The model assists teachers in the implementation of smart technologies into the process of instruction. It consists of four successive steps (levels) which cover two areas (Enhancement, Transformation). Each area includes two steps (Enhancement is structured into Substitution and Augmentation; Transformation covers Modification and Redefinition). In steps one and two, the learning content is enhanced (Substitution) and improved (Augmentation) by the technology. In steps three and four, teacher exploits the
technology to make changes in educational forms (Modification), or uses completely new forms which could not be enabled without the technology (Redefinition). In other words, at the Substitution level, identical tasks and activities are performed as they can be conducted without technology, i.e. there is no functional change in teaching and learning. At the Augmentation level, technology works as an effective tool enhancing the process of instruction. Thus, learners may become more involved in the process. At the Modification level, the first step is made between enhancing the teaching/learning without technology and accomplishing substantial changes in this process through the use of technology. This is a significant change; new methods and tools can be used. Finally, the Redefinition level appears, providing a completely new approach and strategy that could not be allowed without technology—it is not the target, but means enhancing the learning (Netolicka & Simonova, 2017).

Online distance instruction during the covid-19 pandemic

Reflecting the spread of the covid-19 pandemic, schools of all levels were closed in March 2020 and the first period of online distance instruction in the Czech Republic covered a period of three months (by June 2020). The closure was immediate and unprecedented. This fact was reflected in the quality of online distance instruction. At the beginning, teachers and learners did not have sufficient competencies in teaching and learning online, schools and learners did not have appropriate equipment (both hardware and software). Under these conditions, it was rather helpful that immediately after the closure, public television provided lessons to primary and lower secondary school pupils, study materials, exercises, online tests, remote experiments, and other didactic means supporting learning from home were available on various pages despite the fact that the quality they were of different didactic quality. Generally, teachers, learners, and parents expected it to be a relatively short one-off period of online distance instruction that would be finished by the end of the school year (June 2020). However, the covid-19 pandemic did not disappear during the summer holidays (July–August 2020). Meanwhile, the Czech Ministry of Education published didactic recommendations for teachers in which the main rules for online distance instruction were described (Ministry of Education, 2020). Unfortunately, the document was general and schematic, providing rather promotional slogans like Join every learner, Communicate, Follow the rules, Support others, Monitor and appraise the process, but not applying the Comenius’ principles mentioned above.

Furthermore, a new act was introduced defining online distance instruction as compulsory for each learner and teacher (Act N. 349/2020 Coll., 2020) contrary to the spring period, when it was voluntary for various reasons, mainly due to lack of hardware and software, low quality of the Internet signal, and lack of rules at the national level. The MS Teams was selected as a national platform by the Czech Ministry of Education. Consequently, at the end of the summer holidays (August 2020), the schools organized teacher training themselves, being aware of all related negatives to the future quality of instruction which the lack of competency in this area can cause. In September 2020, another wave of pandemic arose,
hand in hand with a new academic year. Thus, teachers had a short period (2–3 weeks) to prepare learners for online distance instruction. In total, online distance lessons were conducted by June 2021, that is, for 18 months. In September 2021, another academic year started. As the covid-19 statistics of infected people decreased significantly, schools were open again and lessons were held as before the pandemic, in the present (face-to-face) form.

In the institutions investigated, online distance instruction was conducted in MS Teams, as required by the ministry. In total, 64 courses taught by 72 teachers were the focus. All courses were taught 90 to 135 min per week by qualified teachers, that is, those who had a degree in the field and in teaching. Compared to March 2020, when all schools were closed promptly, another closure was expected after the summer holidays in September 2020. Therefore, there was a short time to conduct didactic training on how to teach and learn in the online distance manner. The training in using MS Teams was available to teachers in late August before the semester started. The teachers attended a 10-h course in which both theoretical knowledge and practical skills were developed. After the training, they were expected to design and conduct their lessons according to Comenius’ principles, exploiting the TP(A)CK framework, and the SAMR model. However, to be honest, the performance of some teachers was far from the expected process, that is, learner-centered, efficient, running in a pleasant and working environment, as we trained them. When investigating the causes of this state, we found out identical circumstances as analyzed in latest studies, for example, insufficient hardware and software equipment, low level of digital skills or hardly any interest in innovations in teachers that resulted in low level of knowledge in their learners (Cirus et al., 2019). Furthermore, learners had to do a lot of self-study, which requires much self-determination, effort, and motivation. Consequently, a lack of ability of self-regulated learning resulted in their failure in learning (Klimova et al., 2022). To reach a high level of self-regulation, metacognitive strategies should be developed in learners in times of traditional learning, and, then, applied to online distance learning. This is a long-time objective that requires much effort; it cannot be reached in a short-time perspective, when in need. Teacher training, both pre-service (prospective) and in-service teachers, can be the way how to improve the current state.

Methodology

Research problem

When this research started, the Czech education system had had a three-month-long experience in online distance instruction (ODI). Although numerous teachers and learners had used latest technologies for education (blended learning), the covid-19 pandemic reached them rather unprepared for ODI or hybrid learning. As it was evident that the pandemic will not end soon, emphasis was put on the quality of ODI, and, consequently, the quality of teacher training in this field.
Research questions

In connection to this problem and based on the previous research of this team, questions appeared related to online distance instruction.

1. What types of support did teachers provide for learners within online distance instruction?
2. What types of sources (study materials) were exploited within ODI?
3. What means were used for practising and fixing new knowledge within ODI?
4. What types of assessment of learners’ performance were applied within ODI?
5. What was students’ feedback on ODI—in particular:
   6. (5.1) How much effort did teachers invest in ODI?
   7. (5.2) How much effort did students invest in ODI?
   8. (5.3) Was ODI appreciated by students?
   9. (5.4) How much did students learn through ODI?

Research objective

Considering all the above mentioned, the main objective of the research was to monitor students’ opinion and discover the main didactic features of online distance instruction; based on the collected data to define didactic recommendations towards improving the quality of the process.

Before the research started, even after the training, we were aware that the level of teachers’ knowledge differs, as well as their motivation, willingness, and efforts towards online distance instruction. Identical features could be seen in learners. In addition, we also took into consideration that each course differs in its appropriateness for online distance instruction. On the other hand, there are didactic principles (as mentioned above) that should be followed when designing and conducting online distance courses under any conditions. We can assume that if the didactic principles (including the TP(A)CK framework and SAMR model in this particular case) are implemented, the online distance instruction is successful and the appropriate level of knowledge is developed in the learners as defined in the syllabus. This approach is valid for both face-to-face and online distance instruction.

To learn whether our assumption is true, students’ feedback on online distance instruction was collected. The respondents provided their individual opinion on two online distance courses out of 64. First, each respondent selected a course that they appreciated, liked, enjoyed, and considered efficient from the point of view of their learning, and described how the course was designed and conducted. Second, each respondent depicted a course which caused them discomfort in learning, that is, the course was conducted in a way that did not suit them, and their learning did not bring the expected learning outcomes. In other words, one respondent provided positive and negative feedback on online distance instruction through the evaluation of learning in two courses. The courses that received
positive feedback are called courses A, and the courses that have negative feedback are called courses B below. Feedback on courses serves as a basis for defining didactic recommendations.

**Hypotheses**

Within testing the hypotheses, we compared the frequency of occurrence of didactic features in five areas in courses A and courses B. Four main hypotheses, followed by four partial ones in H05 (H05.1–H05.4), were set to achieve the research objective. Hypotheses were set in the null form.

**H01** There are no statistically significant differences in the frequency of occurrence of didactic features in the area of teachers’ support for learners within ODI in courses A compared to courses B.

**H02** There are no statistically significant differences in the frequency of occurrence of didactic features in the area of types of sources exploited within ODI in courses A compared to courses B.

**H03** There are no statistically significant differences in the frequency of occurrence of didactic features in the area of means used for practising and fixing new knowledge within ODI in courses A compared to courses B.

**H04** There are no statistically significant differences in the frequency of occurrence of didactic features in the area of assessment of learners’ performance within ODI in courses A compared to courses B.

**H05** There are no statistically significant differences in the frequency of occurrence of didactic features in the area of students’ feedback on ODI in courses A compared to courses B, in particular:

**H05.1** There are no statistically significant differences in students’ agreement with the statement *Teacher invested much effort in online distance teaching* in courses A compared to courses B.

**H05.2** There are no statistically significant differences in students’ agreement with the statement *Student invested much effort in online distance learning* in courses A compared to courses B.

**H05.3** There are no statistically significant differences in students’ agreement with the statement *I appreciate online distance learning* in courses A compared to courses B.
There are no statistically significant differences in students’ agreement with the statement *I did not learn much through online distance learning* in courses A compared to courses B.

**Methods and tools**

A comparative analysis that exploits the questionnaire method was applied to the data that describe the process of online distance instruction. The data were collected via a questionnaire. The questionnaire consisted of 36 items. The items were divided into two parts. In the first part of the questionnaire, that included items 1–18, students described online distance learning in courses that they liked and appreciated (courses A). In the second part of the questionnaire, that included items 19–36, the students’ answers related to the courses the learning in which they did not like (courses B). The items in both parts of the questionnaire were identical. First, there were ten items of nominal type; respondents made a choice from provided answers. Second, there were four statements; respondents answered on the four-point scale (Fully agree, Rather agree, Rather disagree, Fully disagree). Third, there were four open-answer questions where respondents could freely (but voluntarily) express themselves and provide detailed answers on advantages, disadvantages, problems, and recommendations on online distance instruction. Considering the type of data, reliability was calculated for answers to the four statements only reaching Cronbach alpha (Cronbach, 1951) $\alpha = 0.76$; accepted values are $0.7—0.95$ (Tavakol & Dennick, 2011). Validity of the tool was considered by the team of experts in the field of educational science, when publication activities within last five years were required for the expert position.

Data collected by the questionnaire were processed as follows. To test the null hypotheses H01–H04, Chi-Square Test of Independence was applied on statistic processing of the first ten items of each part of the questionnaire (1–10; 19–28). If the hypotheses are rejected, an analysis of adjusted residuals is calculated to detect significant differences. Then, data collected through other four items of each part of the questionnaire (11–14; 29–32) were used to test the null hypotheses H05.1–H05.4. For this purpose, $t$ test statistics comparing means was applied. Finally, four open-answer items concluded each part of the questionnaire (15–18; 33–36). Students’ answers were used to provide a deeper insight in the examined areas.

The questionnaire was created in three phases.

First, the questionnaire was designed by a team of five experts in didactics (two experts from University of Ostrava, Faculty of Education, Department of Information Technologies, two experts from the Department of English Language and Literature, one expert from the Upper Secondary School for Medical Staff and Higher Medical Staff, Olomouc). The experts considered the validity of the questionnaire, with a special focus on the content validity. Each expert assessed each item of the questionnaire on the scale from 1 to 5 (1 was the worst, 5 was the best). Items reaching less than 4 were discussed by the team and rewritten until all experts were satisfied.
Second, the questionnaire was considered by six teachers who participated in the training described above. After reading the questionnaire, they proposed several minor changes and discussed them with the experts.

Third, the questionnaire was piloted in the group of 28 students from the University of Ostrava, Faculty of Education, Department of Information Technologies (N = 12) and Department of English Language and Literature (N = 16) during the first lockdown in the Czech Republic (March–May 2020). Based on the feedback, final minor changes were made.

The content of the questionnaire reflected the research questions.

In the area of teachers’ support for learners within online distance instruction (ODI), motivation, advice on how to study online, and communication were observed as follows:

- Motivation (Did the teacher continuously motivate the learners during the semester?)
- How to study online (Did the teacher provide learners with continuous advice on how to study in ODI? All learners underwent a brief training in ODI by subject teachers before the semester started.)
- Communication (Was the communication conducted in groups? Was it initiated by the teacher?)
- Communication (Was the communication conducted individually? Was it initiated by the student because the teacher did not communicate?)
- Communication (Was the communication conducted individually, when the teacher answered the student’s question?)
- 1st contact in week 1–2 (Was the 1st contact made in week 1–2 of the semester?)
- 1st contact in week 3+ (Was the first contact made in week 3 or later?)
- Regular communication (Was the communication regular?)
- Irregular communication (Was the communication irregular?)
- Frequency once or twice/week (Was the communication conducted once or twice per week, that is, following the schedule?)
- Frequency three or four times/week (Was the communication three or four times per week, that is, more frequently than scheduled lessons?)
- Less frequently (Was the communication conducted less frequently than scheduled lessons?)

In the area of sources exploited within ODI, the following features were observed:

- Professional texts (Teacher provided scanned books, chapters, articles etc.)
- Presentations (Searched, or created by teacher)
- Video-recordings (Searched, or created by teacher)
- Other sources (Students provided their work, e.g., papers, surveys, reports etc.)
- URL (Teacher provided links to sources)

In the area of means used for practising and fixing new knowledge within ODI, the following features were observed:

- Exercises
- Asking questions and discussions
• Online tests with correct answers (Tests)
• Online tests with correct answers and explanation (Tests+)

In the area of assessment of learners’ performance within ODI, following features were observed:

• Final exam—online test (Final exam was in the form of online test that was administered from home, asynchronously, without camera, the fields to be studied were displayed in the syllabus.)
• Final exam—oral, online (Final exam was oral, conducted online, in the form of discussion between the teacher and two students at once, fields to be studied were displayed in syllabus, questions were selected from the list, immediately answered by students, without taking notes.)
• Progress (Teacher spoke to each student individually and assessed what their progress was.)
• Further learning (Teacher spoke to each student individually and assessed what they should improve in the future.)

In the area of students’ feedback on ODI, respondents expressed their agreement/disagreement with four statements using the four-level scale (Fully agree, Rather agree, Rather disagree, Fully disagree). The statements were as follows:

• Teacher invested much effort in online distance teaching.
• Student invested much effort in online distance learning.
• I appreciate online distance learning.
• I did not learn much through online distance learning.

Finally, there were four open-answer items at the end of each part of the questionnaire where students could express their opinions dealing with advantages and disadvantages of online distance instruction, describe problems, and provide their recommendations towards improving the process. Students’ responses were voluntary.

Research sample

In total, 272 respondents (Female = 178; Male = 94) participated in the research. They attended three institutions: upper secondary school for medical staff (N = 131), advanced studies for higher medical staff (N = 69), and the University of Ostrava, Faculty of Education, Department of Information Technologies and English Language and Literature (N = 72). Students of advanced studies and university students were included in the sample of higher education (HE).

Institutions were intentionally selected from the following reasons: (1) They were authors’ home institutions so that the conditions for conducting online distance courses were firmly established and well known to them. In addition, the authors also participated in teacher training in online distance instruction and continuous consultations. (2) All the researched courses included theory and practice (in hospitals, laboratories, and schools); however, only the theoretical courses taught in the online distance manner were under the focus of the research. (3) The preparation of medical staff, higher medical staff, prospective teachers of Informatics and English language belongs to the profile fields. The study programmes preparing students in
the fields have been the focus of the Czech system of education since 2008 (Act. N. 242/2008 Coll., 2008). The structure of the research sample is displayed in Table 1.

| Table 1 Research sample: structure |
| Institution | Male | Female | Total |
|-------------|------|--------|-------|
| Upper secondary school | 22 | 109 | 131 |
| HE: advanced studies | 30 | 39 | 69 |
| HE: university | 42 | 30 | 72 |
| total | 94 | 178 | 272 |

**Results**

Statistic software Statgraphics Centurion XVI was exploited for data processing. All statistics were carried out at α = 0.05 significance level. The results are presented in tables and figures.

In hypotheses H01–H04, based on the results of Chi-Square Test of Independence, where \( P \) value is ≤ 0.05, null hypotheses H01–H04 were rejected:

- H01: \( P \) value = 0.0000; Chi-Square = 496.373; \( Df = 11 \);
- H02: \( P \) value = 0.0000; Chi-Square = 74.996; \( Df = 4 \);
- H03: \( P \) value = 0.0000; Chi-Square = 28.114; \( Df = 4 \);
- H04: \( P \) value = 0.0000; Chi-Square = 145.298; \( Df = 3 \).

This implies that there are statistically significant differences between the observed features. To detect the differences, an analysis of adjusted residuals was performed. If the value of adjusted residual > 1.96, the difference is significant. Values of adjusted residuals are displayed in Table 2. The cells that signify significant differences between frequencies of occurrence in features in courses A compared to courses B are marked with asterisks (*). The positive adjusted residuals indicate that there were more defective handles than expected, adjusted for sample size; the negative adjusted residuals indicate that there were less defective handles than expected.

Table 2 Hypotheses H01–H04: adjusted residuals.

**Results of testing hypothesis H01**

In the area of teachers’ support for learners within ODI, statistically significant differences between courses A and courses B were discovered in the following features: Motivation, Communication in group initiated by teacher, 1st contact in week 1–2, 1st contact in week 3+, Communication regular, Communication irregular, Communication frequency once-twice per week, Less frequent communication. The comparison of frequencies of occurrence in courses A and courses B is displayed in Fig. 1.
Results of testing hypothesis H02

In the area of *types of sources exploited within ODI*, statistically significant differences between courses A and courses B were discovered in the following features: Texts, Presentations, Video-recordings, URL. The comparison of frequencies of occurrence in courses A and courses B is displayed in Fig. 2.
Results of testing hypothesis H03

In the area of *means used for practising and fixing new knowledge within ODI*, statistically significant differences between courses A and courses B were discovered in following features: Questions and discussions, Tests, Tests +, Other activities. The comparison of frequencies of occurrence in courses A and courses B is displayed in Fig. 3.
Results of testing hypothesis H04

In the area of assessment of learners’ performance within ODI, statistically significant differences between courses A and courses B were discovered in following features: Exam—online test, Exam—oral online, Further learning. The comparison of frequencies of occurrence in courses A and courses B is displayed in Fig. 4.

Results of testing hypothesis H05

Hypothesis H05 was structured into four sub-hypotheses H05.1–H05.4. Based on t-test statistics of means, all hypotheses H05.1–H05.4 were rejected for $\alpha=0.05$. The statistic results are displayed in Table 3.

The results mean that there are statistically significant differences in respondents’ degree of agreement with the statements. In courses B, learners expressed significantly higher degree of disagreement with statements 1–3. It means they do not think that teachers devoted much effort to online distance teaching. And, they
honestly stated that neither they devoted much effort to online distance learning. As a result, learners in courses B did not appreciate online distance instruction; and they agree that they did not learn much through it. In courses A, the degree of disagreement with statement four was even higher than in courses B. It logically means that those giving positive feedback on online distance instruction do not
think they did not learn much; in other words, they stated they learned much and they were satisfied with the way how this result was reached.

Results showing difference between courses A and courses B are displayed in Fig. 5 as follows:

In Fig. 5 (upper left; T effort), respondents’ opinion on statement *Teacher invested much effort in online distance teaching* is presented. A significantly higher degree of disagreement with the statement in courses B was detected in hypothesis H05.1.

In Fig. 5 (upper right; S effort), respondents’ opinion on statement *Student invested much effort in online distance teaching* is presented. A significantly higher degree of disagreement with the statement in courses B was detected in hypothesis H05.2.

In Fig. 5 (bottom left; I appreciate ODI), respondents’ opinion on statement *I appreciate online distance instruction* is presented. A significantly higher degree of disagreement with the statement in courses B was detected in hypothesis H05.3.

In Fig. 5 (bottom right; I did not learn much), respondents’ opinion on statement *I did not learn much through online distance instruction* is presented. A significantly higher degree of disagreement with the statement in courses A was detected in hypothesis H05.4.

Finally, students described main advantages and disadvantages of online distance instruction, problems, and provided their recommendations in four open-answer
items at the end of each part of the questionnaire (items 15–18; 33–36). They frequently mentioned technical problems and missing technical support, lack of digital competency for education in some teachers and students, decreasing motivation to learn autonomously, lack of competency of autonomous learning, problems with time management in teachers and students etc. Results of this part of the questionnaire are not presented separately; they are implemented in the discussion and didactic recommendations.

**Discussion of results**

As mentioned in the literature review, our research applies a multicriterial approach. It focuses on five areas of online distance instruction, each consisting of several features. The variety of features forms a didactically rich environment for designing and conducting online distance instruction. Learners had available appropriate teacher support, various types of study materials (sources), means for practising new knowledge, for assessing their performance, and they provided feedback on the process. These areas and features gave us a rather complex view of online distance instruction, which was the main contribution of the research compared to other studies that focused on single or pairs of features as mentioned below.

Within the area of teacher support, teacher–learner communication, learner training how to study online, and motivation to online distance learning are discussed. Teacher–learner communication, which is generally considered the cornerstone of the process of instruction (Prucha, 2010), was investigated by Zarzycka et al. (2021) in the process of online distance instruction. They discovered that the farther the ‘distance’ between the teacher and learner is, the higher the quality of communication is needed (2021). In practice it means, that learners expect the communication to be regular, usually following the schedule of the course. If the course is scheduled twice a week, students should be contacted with the same frequency as minimum. The same result was discovered in our research. In addition, if some barriers to communication appear, learners should be informed about the problem, including the time it can take and tasks and activities that they are to do meanwhile (Doyumğaç et al., 2021). There is also a possibility the learner starts communication with teacher; however, sometimes, the it may be beyond teacher’s capacity to carry individual communication with single learners. But, what must not be omitted is that learners should be trained how to study online distance before the instruction starts, and continuous methodological and technical support should be provided to them. He and Yang (2021) proved that technology can enhance the process of learning, motivation, attitudes, engagement, self-confidence, and many other factors. They examined a problem they call technological barriers and learning outcomes. They distinguish first-order barriers extrinsic to learners, that is, access to online distance courses, support from their provider, time for studying, training to study online, and second-order technological barriers intrinsic to learners, that is, lack of vision and belief in appropriate technology integration into teaching. Between the two barriers, there are instruction outcomes, that is, perceived progress, satisfaction, engagement, and high-order thinking (p. 94). Their results imply that learners with higher
belief are those more likely to gain higher outcomes in learning online. Learners with higher vision are those more likely to gain higher engagement and high-order thinking. The more one thinks training as a barrier, the less one achieves higher outcomes. The more one thinks access a barrier, the more one achieves better satisfaction (p. 99). This concept of technological barriers is closer to motivation than to real obstacles that the non-functioning technology may cause to online distance learning, as described in our research. However, technological barriers also work to the detriment of the process. The call for motivation was detected not only by our respondents but also in researches by e.g., Bekesova et al. (2021), Cheung et al. (2021). Examining motivation should be complex, multifaced, and situation-dependent because low motivation contributes to bad study results (Deci & Ryan, 1985). As discovered a decade ago (e.g. by Hartnett et al., 2011), motivation as the mover of any activity is necessary for online distance instruction as well. A current question asked by Che Soh et al. (2022) and based on their own experience is why learners are less motivated in online distance instruction. Their findings are relevant to subjects that rely on group projects and state that learners have a high self-efficacy perception; they are confident that they can do an excellent job and receive excellent grades if they really understand the problems of the subject they study. Therefore, to acquire the learning content and understand it is very important for them. In other words, if the online distance instruction is well designed and conducted by the teacher, learners can succeed, and are motivated to further learning.

Regarding the types of study materials and sources for online distance learning, Amez et al. (2021) discovered learners’ constant support to taking notes from teachers’ explanations, even if the lectures were given online. This possibility was not mentioned by our respondents at all. Moreover, recordings of full lessons were popular in the research by Amez et al. (2021), mainly for their availability any time, either for the first or repeated use. But what both groups had in common was the preference to slide shows (mostly in MS Power Point) that present or support teachers’ explanations. Contrary to this, Cheung (2021) compared the perceived usefulness of various types of open educational resources (OER) at the end of the first semester of 2019/2, when typical face-to-face instruction was held, to 2020/2021, when online learning was fully adopted. Cheung has been investigating this problem for several years. The comparison of both years showed that in 2020/2021 learners’ perception of the usefulness of OER was generally higher. In particular, it increased in open online courses, open online tutorials, open access e-book. On the other hand, learners were also interested in weaknesses of OER, for example, the accuracy and comprehensiveness of the materials, and their use in online distance instruction. Another feature that was detected in our research was the use of an online platform for distance instruction. Whereas most of our respondents spoke well of MS Teams that was determined by the Ministry of Education to be a national platform for online distance instruction, in the research Cancino and Avila (2021) it was Blackboard Collaborate that was used as a fully online language environment by many universities. Compared to our multicriterial approach, their findings confirmed what had been known, that is, that poor interactions with peers had negative impact on social presence of learners and consequent interactions within teaching and learning.
According to our research results, in practising and assessing new knowledge, online tests were rather popular. From the didactic point of view, it is more valuable if the feedback provides not only a correct answer but also an explanation and, if the answer is not correct, also a source where the learner can study the topic again. If online tests are used for assessment, the value of the test result is higher, if teachers are sure that learners worked independently, without any dishonest behaviour (Holden et al., 2021; Noorbehbahani et al., 2022). As it has been detected worldwide, there exist numerous didactic recommendations how to minimize the opportunities of such behaviour (Nguyen et al., 2020; Dendir & Maxwell, 2020). Unfortunately, cheating and plagiarism are not considered unfair in some cultures (Perkins et al., 2022). As our results prove, if learners have technical support available, they appreciate online oral exams. In the opposite case, they feel stressed of failing the system, or they make excuses on technical problems. Şenel and Şenel (2021) devoted to remote assessment in online distance instruction, in particular, they sought common assessment approaches used through the covid-19 pandemic. Results indicated that assignments were the most frequently used tools and students were generally satisfied with the quality of the assessment practices, including the formative assessment and feedback in remote assessment. The research focuses on technical subjects and does not clearly define how the assignments look like. In our research, assignments (single tasks) were not set. In English language either vocabulary and grammar online tests were used for practising and assessment, medical knowledge was monitored by didactic tests, learners did individual or group projects or presentations in all courses. The testing was conducted during the semester, projects and presentations had individualized deadlines for each learner or group of learners. In our opinion, it is not crucial to apply a wide range of methods to assess learner’s work in the course. If the learner has experience in the method of assessment and its shortcomings, they can meet the requirements more successfully, that is, they can focus on the content, not on the format. This approach is emphasized by Jayawardena et al. (2021) who analyzed the effectiveness of various online assessment types in relation to the methods of content delivery.

The final part of our research, respondents’ feedback, is what makes the view of the online distance instruction complex. In addition to our research, where respondents provided feedback on four statements dealing with teacher’s effort, student’s effort, their appreciation of online distance instruction, and how much they learned online distance using the Likert scale, Fidalgo et al. (2020) conducted another, rather complex survey in three states, Portugal, the United Arab Emirates (UAE), and the Ukraine. They investigated learners’ perceptions, attitudes, and willingness to learn online distance, and based on the results they provided guidance and recommendations for higher education institutions. Although the study monitors the state before the covid-19 pandemic, the results can be applied to the situation during and after the pandemic. Open-schedule courses, followed by blended synchronous learning, were preferred by the respondents; however, Portuguese learners had little experience in distance learning compared to other states, which might explain their positive attitude. In the UAE, most online distance courses have not been accredited by the Ministry of Education (United Arab Emirates Ministry of Education, 2016), which may result
in lack of experience in UAE learners and their inability to judge this type of instruction. Ukrainian students reported a high level of confidence in operating technological devices. The reason for this may be, in part, a high level of requirements in the state curriculum. The main reasons why students enrolled in online distance courses were time management, self-regulation, and higher retention rates, as also supported by other studies, e.g., Bradley et al. (2017), Peck et al. (2018). Having more control of their study time is also one of the benefits of online distance instruction (Alshmari, 2017). Regarding the reasons for not enrolling in online distance courses, respondents from the three countries mentioned difficulty in contacting teachers and peers. They all preferred face-to-face lessons. They were afraid they would lose a familiar type of interaction and have to engage with classroom participants in a new and different way. Fidalgo et al. also noted that Portuguese and UAE students were prospective teachers trained for face-to-face teaching so they may not have understood the potential of fully online distance format and did not expect to use it in their professional careers. This conclusion clearly shows that before 2020, hardly anybody could imagine a two-year long period of online distance instruction. A lack of motivation was another reason why learners did not prefer to enrol in online distance courses. It was likely connected with a lack of experience in online distance learning and confidence with their ability to learn online distance. However, this is in contrast to controlling their study time. Strong personal discipline is needed if one wants to manage their own time. Identical contrast appeared in our research, when some students were satisfied with learning from home; they spent less time on learning but the time was spent usefully, it was not wasted, and they had more time for their hobbies and friends, although in most cases the socializing took place in the virtual world only. Contrary to this, other respondents complained, they were not able to concentrate on learning, they spent hours in front on the computer doing nothing because they were not able to, they did not understand the task, they needed didactic or technical help etc. From the view of didactics, the most important topic was the training of learners for how to study online. As mentioned in our research, learners were briefly trained by teachers before the new academic year started. While our teachers trained learners how to use tools of MS Teams for conducting online distance learning, where to find the syllabus of the course, where and how to conduct communication, where to find study materials, exercises, and online tests, how to assess learners’ knowledge etc., Fidalgo et al. (2020) called this area ‘computer skills’. It means that their respondents were not sure whether they could manage the tools to conduct online distance lessons that were taught in English language—none of them was an English native speaker. Some learners from all countries were not sure whether they are able to succeed in acquiring the learning content under these conditions. In agreement with our results, the need for help (both didactic and technical), and training are some of the concerns that respondents reported. Similar criteria were used by Gopal et al. (2021) or Maatuk et al. (2022): quality of teacher, quality of course design, teacher’s prompt feedback, and student’s expectations. These criteria form perceived satisfaction with the course and perceived performance of the learner. The findings indicate that the quality of the teacher is the most important factor that
affects students’ satisfaction during online classes. Teachers must understand students’ psychology, be enthusiastic, continuously motivate the learners, and provide them with feedback, which satisfies learners and enables teachers to improve the courses in the future. These results show that if TP(A)CK framework is followed, online distance instruction can be acceptable and useful to the learner.

From the point of view of works mentioned in the introduction, the process of acquiring of new knowledge was examined by Lim et al. (2022). They focused on the effect of active learning in dental students. In particular, they examined four group of students, each learning in a pre-defined way. In group 1, lectures and discussions were held; in group 2, lectures and discussions were conducted with instructor’s worksheet; in group 3, self-study and discussion were applied; in group 4, self-study was supported by discussions with the instructor’s worksheet. Final test scores underwent the analysis of variance and showed the best results in the group that learned through self-study and discussion, followed by the group using self-study and discussion with instructor’s worksheet. This result can be connected in students’ call for communication (see Table 2, communication in groups, and hypothesis H01 Teachers’ support for learners within ODI). Another investigation of nursing students’ performance was made by Chen et al. (2022). They compared network (online distance) and traditional (in-class) teaching. The analysis of the performance did not show significant differences. Therefore, they propose to combine these two approaches even in the times when the covid-19 restrictions are cancelled. This conclusion which is also in compliance with our recommendations. Contrary to this, mind maps were not mentioned in our research. However, Alsuraihi (2022), who focused on their used during the covid-19 pandemic, examined a group of medical students and proved that mind maps contributed to the effectiveness of online teaching and students’ satisfaction with it. Students believed that they developed skills of organizing, planning, decision making, and critical thinking, when working with mind maps. Besides knowledge, the feelings and motivation are of the same importance in learning. Using the Big Five Inventory, Challenge and Hindrance Stress Scale, and the Online Student Engagement Scale, Quigley et al. (2022) discovered that conscientiousness positively affected all types of online engagement; extraversion influenced participation and performance, neuroticism predicted engagement skills, emotional engagement and performance, agreeableness and openness to experience impacted participation and emotional engagement. Contrary to these, stress perceived as a hindrance negatively predicted performance. These results are in agreement with other works mentioned below. Exceptionally, mild stress can work as a motivator (Morgado & Cerqueira, 2018). However, covid-19 distress required the competency of self-regulated learning (Hadwin et al., 2022). If developed in learners, it impacted academic performance and success in learning. It had been proved in the past that self-regulated learning was a better predictor of online learning effectiveness. Whether it worked under the covid-19 restrictions was investigated by He et al. (2022). They considered three stages of self-regulated learning—the preparatory stage, the performance stage, and the appraisal. The results suggest that better performance in the three stages decreases learners’ perceived ineffectiveness in online learning. The lack of self-regulation/autonomy was also mentioned by respondents in our research in final four items in each part of the
questionnaire). As a consequence, they mentioned problems with time management and planning the work, with finding additional sources to study from, critical assessment of collected information etc.

The need for prospective teacher training at faculties of education as a solution of problems connected with online distance instruction was mentioned by Tan (2020). It was a result of investigation of the impact of Movement Control Order at the very beginning of covid-19 pandemic. The findings indicated that students lost motivation and the learning performance decreased when online learning methods were used. In addition, there was an insufficient infrastructure to support the learning. This state of environment is similar to the one in the Czech Republic at the beginning of the pandemic; however, it improved over a period. As proved by Limniou et al. (2021), students with high level of self-regulation and digital capabilities were able to succeed in online distance instruction, they coped with changes relating with the mode of delivery easily. However, teachers should not forget, there are still some students who need more support to succeed. The professional quality of the teacher can help much, as Clark et al. (2021) stated. They found that students who studied from recorded online lessons given by recognized experts reached higher exam scores than those who learned from lessons recorded by teachers from their school. On the other side, there were no differences in results between learners in urban and rural schools, but between those who used computers/notebooks and smartphones for online learning (in favour of computers/notebooks). This criterion was not examined in our research but the problem of small screen is researched, for example, by Alasmari (2020), or by Cirus et al. (2019) in the Czech Republic. Specifically, the study investigates the effect of screen size on students’ cognitive load in mobile learning, and, proves that the use of an appropriately larger size improves learner’s knowledge. In this context, of course, the size of screen is important, as well as from the view of not to damage sight in general.

**Didactic recommendations for designing and conducting online distance instruction**

As the need for online distance instruction appeared rather unexpectedly and neither in-service, nor pre-service (prospective) teachers had time to undergo deep training, there is a high demand for information on how this process is conducted, what teaching and learning methods and forms are the most efficient, and whether/how learning outcomes of high quality and retention can be built. As Mishra states (2020, not paged), world-wide education has been disrupted by the covid-19 pandemic on an unprecedented scale. Since March 2020, we have been living through the largest educational social experiment in history. From the point of view of educational research, there will be no pedagogical experiments any more comparing results of an experimental group exploiting ICT in the process of instruction and a control group taught without technologies. Now, all the learners are in the experimental group. The Comenius’ principles, that originally related to the face-to-face instruction, should be applied in a creative way in any process of instruction and educational activity. In spite of the fact that the classification
of educational principles differs in conception and interpretation, they reflect main features of the whole process. They all interdigitate, influence one another, depend on each other, work together to create the final’ product’—an educated person.

If the process of didactic principles application is to be successful and efficient, following features should be integrated in teacher’s personality: (a) a mature individual, that is, the teacher should be well balanced in cognitive, affective, conative, and physical aspects, well integrated, stable and harmoniously adjusted to himself, to others, and the outer world; (b) a psychologist, that is, an expert in understanding learners’ minds and acquiring new knowledge; (c) a teacher, particularly an expert in didactics; (d) an expert in the subject (field). The order of the characteristics is obligatory. Only a mature person is able to bear and meet the requirements made on teachers, a good psychologist is able to recognize learner’s strengths and weaknesses, a good teacher is able to design, create, and perform the process of instruction efficiently, and, an entire expert knows the subject well. Within lessons, teachers should organize lessons carefully, strive for clarity in explanations, communicate with an enthusiasm for the subject and the lesson, keep all students involved, and continuously broaden knowledge in the field (Simonova, 2006).

When writing about Comenius’ principles in the text above, we intentionally did not specify whether face-to-face or online distance instruction was the research focus. The reason is that the principles are valid for both forms. Before making any decision within online distance instruction, we should have in mind that it is one of several ways how lessons can be conducted. We understand that this is a specific way that requires new competencies from both the teachers and learners, technical and technological equipment of schools and households, but still, it is a way. Also, general didactic principles are valid in online distance instruction as well. Thus, despite calling them didactic recommendations for online distance instruction, they arise from the general principles that have been adjusted to the online distance conditions.

Reflecting the results presented above, we propose the following recommendations for successful online distance instruction:

- Teachers should contact learners at the very beginning of the semester. The institution should clearly announce before the semester how the first contact will be made. For example, the learner’s institutional email can be used for the first contact, then, online distance instruction can be conducted on a platform or in the Learning Management System (LMS). These are preferable to other possibilities for the complexity of tools.
- Teachers should exploit minimum ways to conduct the online distance instruction; e.g., MS Teams or LMS Moodle are frequently used in the Czech Republic, but other services are also available. The constant search makes learners tired and demotivated before they start learning.
- Learners should receive main information about the platform (or how the course will be taught), schedule, syllabus, including tasks, deadlines, requirements. Moreover, information about technical and technological requirements should be provided, for example, whether a notebook (computer) is necessary or smart-
phone will be sufficient for the courses, whether other hardware and software is needed, including the quality of the Internet connection, etc.).

- Contacts should be conducted regularly from the teachers’ side so that learners can plan their learning and design the learning schedule, including deadlines to submit their work done autonomously, and fulfill other required tasks, perform online tests etc. This information is mainly needed for learners who share hardware with siblings or parents.

- Teacher–student contacts should be made on a regular basis, following the schedule as minimum.

- Student–teacher contacts should also be possible to provide special support for a learner or for solving individual problems.

- The learners’ motivation should be continuously enhanced by teachers.

- Learners can also be motivated by other learners through discussions, via providing advice, or any other support.

- Permanent technical support should be available to learners, for example, from a school administrator.

- Together with the technical support, the role of home environment is very important, particularly whether learners have their own room or any quiet place for learning, and whether they have required hardware available (computer, notebook, or printer, scanner etc.) (Simonova et al. 2021a).

- Within the process of acquiring new knowledge, various types of study materials, exercises, online tests with different tasks are welcome (multiple choice, matching, drag and drop, word order, and many others); learners may select those types which meet their learning preferences, including those with special educational needs.

- Online tests with feedback + are highly recommended, that is, the tests not only detect in/correct answers and give explanations why the answer is not correct, but also link to sources where the learning content is explained and can be practised again.

- Discussions among students in groups are recommended—learners are usually not stressed when speaking to their peers.

- It is preferable that learners’ knowledge is assessed in oral online distance exams held with single students, in pairs, groups, depending on the course content and number of learners. This way places high demands on teachers, particularly on time and organization. On the other hand, it recalls the learners of standard conditions to a large extent.

- Contrary to oral online distance exams, online tests administered by learners from home, without a camera, with the possibility of unwanted contacts with others, are much easier to be organized and corrected, but they bring hardly any didactic benefits.

- In addition, learner’s progress within the semester should be defined by the teacher so that each student knows what they improved on and what to focus on in the future.

To conclude, within online distance instruction, learners should be aware that how much they learn is in their hands to a large extent. Their effort is even more
important than in face-to-face lessons. The longer the process, the more important role the motivation from teachers plays. To motivate the teachers, strong support is expected from the school management, Ministry of Education, local authorities, or parents. Last but not least, teacher preparation to use technology and exploit it for educational purposes is the first precondition if we expect the process of online distance instruction to be conducted successfully. Lack of time, which is often expressed as the primary barrier to developing the new competency in teachers (Polly et al., 2021), is often supported by their mistrust of benefiting from the it. On the other hand, bright prospects from the exploitation of technologies in education are emphasized by their supporters (Faltynkova et al., 2020). Therefore, strong attention should be paid to the prospective teacher preparation. As young people, they have a closer relation to technologies in general, and it should not be wasted (Lim & Newby, 2020).

**Limits and further research activities**

The results of this research are limited mainly by the sample. First, the size (N = 272) does not allow us to generalize the results for two reasons: (1) participating students were from several study programme despite the programmes are under the focus of Ministry of Education; (2) the research sample was not gender-balanced (having 65% of female participants). However, in reality, there are more women-teachers in the Czech education system (78% in average). The balance changes depending on the school level. Whereas in pre-primary schools (nursery schools, kindergartens), female staff is significantly dominating, the higher the school level, the higher the number of men-teachers are detected. Male teachers prevail in higher education (OECD, 2017).

Since the very beginning of the research, we did not intend to generalize the results. We planned to get feedback from those who attended teacher training designed and conducted in accord with Comenius’ principles, showing in practice how they should be implemented. We intended to discover how the trained participants succeeded in online distance instruction immediately after this training, under the then conditions described above, that is, teachers’ competency in online distance instruction was under the focus.

**Conclusion**

Since 2019, a large number of investigations have been conducted in the field of online distance instruction, focusing on various features or phases of the process (Valverde-Berrocoso et al., 2020). Learners’ and teachers’ perceptions were monitored, various methods, platforms, tools were tested, numerous conferences were held, and didactic, technical, and technological recommendations were provided. When using combinations of key words online distance instruction/education, research, and others, we can get a long list of articles dealing with the topic. The research results mainly differ according to the conditions for education in a country.
The main contribution of this research is that we gained deeper insight into several areas of online distance instruction. Thus, we were able to detect various features of the process. Taking these into account, we defined didactic recommendations on how to design, conduct, and improve online distance instruction. As our findings show, teacher training is necessary under any conditions. The quality of training partly depends (1) on those responsible for the field—to support this, a board dealing with online distance instruction was established in the Czech Republic; (2) on participants of the training—in particular, on their motivation, willingness to gain new competency, on whether they receive (financial) support, social recognition etc. The criteria are closely related to the work of the Ministry of Education and are reflected in daily teaching in schools. It is clearly visible that there exists a wide range of problems that deserve the attention of researchers in the future. In our opinion, further research activities should focus on how students of various learning styles or motivation types cope with online distance learning, whether/how learners with special educational needs can be educated online distance, etc. In the Czech Republic, the initial steps have been done, e.g., Simonova et al. 2021b, or Gybas et al. 2021. These are the research problems that should be solved on the national level as minimum because large samples are needed for researching single types of learners, and for generalization of results.

Last but not least, how to answer the main question (of this Special Issue) asked at the beginning on redefining and/or rethinking the learning process through educational and technological innovations. In our opinion, re-defining the learning is not the question of the day. As proved in this research, identical principles and rules should be implemented in both the processes of instruction (Comenius, 1948), regardless of whether it is conducted face-to-face or in an online distance manner. Moreover, other authors or models adapted the principles to the conditions of the digital age, as Cerna (2019) mentions. Therefore, strong changes must be made in re-thinking the online distance process of instruction, both in students’ and teachers’ perception of the process. Deeply and constantly updated knowledge of latest technologies in teachers and learners will make the process of online distance instruction successful. Technologies are here to serve, for both private and educational purposes. However, face-to-face contact and communication on any topic, including from the field of education, still dominate between human beings. In addition, latest technologies, that is, smart devices and applications, have potential to contribute substantially to this process (Peng et al., 2019).

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