

EDU WORLD 2022

Edu World International Conference Education Facing Contemporary World Issues

**EDUCATION THROUGH VIRTUAL AND FACE-TO-FACE
COMMUNICATION**

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Abstract

Communication technology has completely transformed the way students interact in the educational sphere in a short time across the whole globe. Virtual networking has increased in importance. We have many communication options, with the possibility to choose the most appropriate option in a given context. The main research objectives of this paper are: the assessment of a group of students in order to determine how they adapt to the new changes in the educational process caused by online teaching methods, the importance of handwriting in the educational process, the role of verbal and non-verbal communication methods, the influence of digital technology in the educational process. In the early days of online-only communication in the educational process, students were excited by the new changes involving a wide range of computer media, such as videoconferencing and e-mail via laptop, phone and tablet. Nevertheless, as time went by, the enthusiasm faded. What was the cause? What are the advantages and disadvantages of virtual communication and face-to-face communication? All these aspects are analysed in this paper through case studies involving students of the Technical University of Civil Engineering Bucharest from the master and from the last year of bachelor studies.

2672-815X © 2023 Published by European Publisher.

Keywords: Digital writing, face-to-face communication, handwriting, online-only communication, virtual distancing

1. Introduction

We live in a dynamic environment, where communication technology has completely transformed the way students interact in the educational sphere in a short time across the globe. The last two years, focused on the online environment, have led to changes in educational communication. Virtual networking has increased in importance. We have many communication options, with the possibility to choose the most appropriate option in a given context.

The study in this paper, dedicated to students and future graduates in the domain of constructions, analyses how virtual communication and face-to-face communication are perceived in the educational process at the university. Online communication took place using the Microsoft Teams digital platform for online meetings in the educational process (voice, image or both were used). Phone calls, teleconferences, web presentations, podcasts, videoconferences, uninterrupted audio-video connections between two or more places, emails and phone messages were also used. The digital platform was also used to access teaching materials, course information, online videos, additional links, digital readings, PowerPoint presentations, quizzes, tests, etc.

2. Problem Statement

This paper aims to analyse the impact of face-to-face communication versus online-only communication in the construction education process. This is a topical issue in the educational process in educational institutions. The main research objectives of this paper are:

- i. The assessment of a group of students in order to determine how they adapt to the new changes in the educational process caused by online teaching methods;
- ii. The importance of handwriting in the educational process;
- iii. The role of verbal and non-verbal communication methods;
- iv. The influence of digital technology in the educational process.

3. Research Questions

A group of 100 students from the last year of bachelor studies and a group of 50 master students, all from the Technical University of Civil Engineering Bucharest (UTCB) were taken into consideration in order to analyse the impact of online, virtual and face-to-face communication in the educational process over the last two years. Most of these students worked in a construction company during summer practice or in parallel with their studies at the university. The questionnaire contained 40 questions. The questions were asked in the course of the semester. Some of these questions are presented below.

A. How do you feel after an intense day of using computer, phone, tablet?

- dizzy, with a headache;
- tired;
- bored;
- pleased, satisfied;
- full of energy.

B. How many hours on average do you spend using your computer, smartphone and tablet?

- maximum 4 hours;
- maximum 6 hours;
- maximum 8 hours;
- maximum 10 hours;
- more than 10 hours.

C. What are the methods applied in the learning process?

- handwriting; digital writing; audio; loud voice; combined.

D. How important is it for you to use handwriting during the learning process?

- not at all;
- a little;
- rarely;
- quite important;
- very important.

E. How effective is the educational process for you?

- through online communication;
- through face-to-face communication;
- by mixed online/face-to-face communication 25% - 75%;
- through mixed online/face-to-face communication 75% - 25%;
- by mixed online/face-to-face communication 50% - 50%.

F. What method of relaxation from intellectual effort do you use?

- sport;
- meditation;
- social gatherings;
- nature excursions;
- cinema;
- movies on TV;
- computer, phone, tablet games;
- painting, other handmade activities;
- writing therapy, journaling;
- other activities.

The present study had also analysed the differences between the answers to the student questions, conducted in 2018 on UTCB students (the analysed group being both final year and master students) and those in 2022 to the same questions. For example:

1. Is communication good within the educational establishment (Stoian & Köber, 2019a, p. 1564)?

- “2% never, 4% very rarely, 11% sometimes, 31% often, 48% very often, 4% always“(2018).
- 1% never, 3% very rarely, 8% sometimes, 20% often, 61% very often, 7% always (2022).

2. Is communication good within the organisation/enterprise (Stoian & Köber, 2019a, p. 1563)?

- “0% never, 2% very rarely, 8% sometimes, 20% often, 64% very often, 6% always” (2018).
- 1% never, 2% very rarely, 6% sometimes, 16% often, 70% very often, 5% always (2022).

The study also consisted of open discussions with students and observation of student differences by the teaching staff in the present compared to four years ago.

4. Purpose of the Study

This paper proposes to study the interdependencies between online and face-to-face communication on the one hand and handwriting and digital writing on the other. The influences of digital communication in the educational process on health are also highlighted.

4.1. Influences of handwriting and digital writing on learning

Handwriting is a complex cognitive process that activates several areas of the brain. Handwriting is unique to each person, it gives us our personal fingerprint and reveals individual personality characteristics. There is a science called graphology, which studies handwriting and identifies certain personal characteristics that define us, our thinking and behaviour.

“Handwriting develops cognitive and motor skills, a skill that influences the ability to read, write, language development and critical thinking. So handwriting improves reading, writing and language skills” (Marcaş, 2019, p. 4).

Handwriting makes it easier to remember information than typing; it improves the memory process. Writing expression, writing speed and the ability to express ideas in writing also help in the learning process. Writing leads to the transmission of signals from the hand to the brain, which helps motor memory.

Notes taken with a pen on paper, rather than on a laptop, provide better quality learning, and writing is an effective strategy for retaining ideas. Notes taken electronically are more inefficient and more difficult to retain than those taken on paper by handwriting are.

Online learning has diminished all these advantages, with many students abandoning more and more the use of handwriting in the educational process.

Digitisation should not be misunderstood as a lack of education. The new technologies allow you to travel, explore virtual worlds without leaving the classroom, you can travel through time and space, witness the unfolding of a trade, profession, having information for career guidance. You can use virtual reality environments for personal and professional development, experiences through contact and communication with young people from different cultural backgrounds, any information you want to find out digital platforms help you. It does not exist nowadays, I do not know, I did not find information. The advantages of developing technology in education are very great but they should be used to our advantage. Professional teacher training continues to be just as important.

4.2. Health vis-à-vis digital technology

Sitting at the computer for long hours (for online courses, homework and social networks), or using smartphones and tablets several times every day, affects health. Our exposure to radiation today is a quintillion (10^{18}) - times more than it was 20 years ago. Radiofrequency emissions from Wi-Fi networks, telephony, smart meters have cumulative effects that cause headaches, dizziness and other health

problems. It is scientifically proven that prolonged, long-term exposure to such cumulative radiation causes possible neurological disorders and cancer.

“Children are at growing risk of present and future ill-health from wireless technology due to weak governments, captured government departments and agencies, corrupt institutions, a compliant press and unethical or ignorant academics” (Johansson, 2019, 0:52).

“In Romania, more than 7.0 hours a day was the average time spend in front of a computer, laptop or phone, according to an international study conducted by Global Media Intelligence Report in 2020” (Andronic, 2020, p. 1). “The time spent on smartphones was around 3.5 hours and on social networks around 2 hours and 20 minutes a day, according to the study” (Andronic, 2020, p. 2).

5. Research Methods

The aim of the questionnaire used in this paper was to quantify the answers to the questions:

- i. How was the educational communication in the only-online system for the considered group of students?
- ii. How was the return to face-to-face communication in the educational system for the analysed students?

5.1. How was the educational communication in the only-online system?

At the beginning of online-only communication in the educational process, students were excited by the new changes involving a wide range of computer media, such as videoconferencing, e-mail, not separated by laptop, smartphone or tablet (see Figure 1).

As a consequence of the increasing dependence of the students group on technology for online communication, the feeling of isolation has become stronger and a sense of disconnection from various social relationships emerged over time.

This „social distancing” had negative effects when electronic communication came to replace almost all communication. So with the passage of time, the desire to return to face-to-face communication became more and more acute.

Psychologist Pearn Kandola at Cisco-System evaluated the impact of online communication on group activities and communication effectiveness. Some of his findings, indicated by Goman (2017), are also reflected in the present study:

“- it takes a minimum of two weeks for relationships established through virtual interaction to gain the social weight of face-to-face relationships;

- the use of audio and video media helps to create and strengthen relationships;

- trust, an extremely important element for group effectiveness, is more easily gained through the use of audio-video” (p. 111).

Generally, students associate new knowledge with already known information and assimilated skills. In order to manage time efficiently, they try to understand in class what the professor teaches and to assimilate new information logically. “Students try to explain in practice what they learn and to find the usefulness of the information in their day-to-day professional life, having the ability to correlate

theoretical and practical aspects. Information is assimilated logically, rather than mechanically” (Stoian & Köber, 2019b, p. 1560).

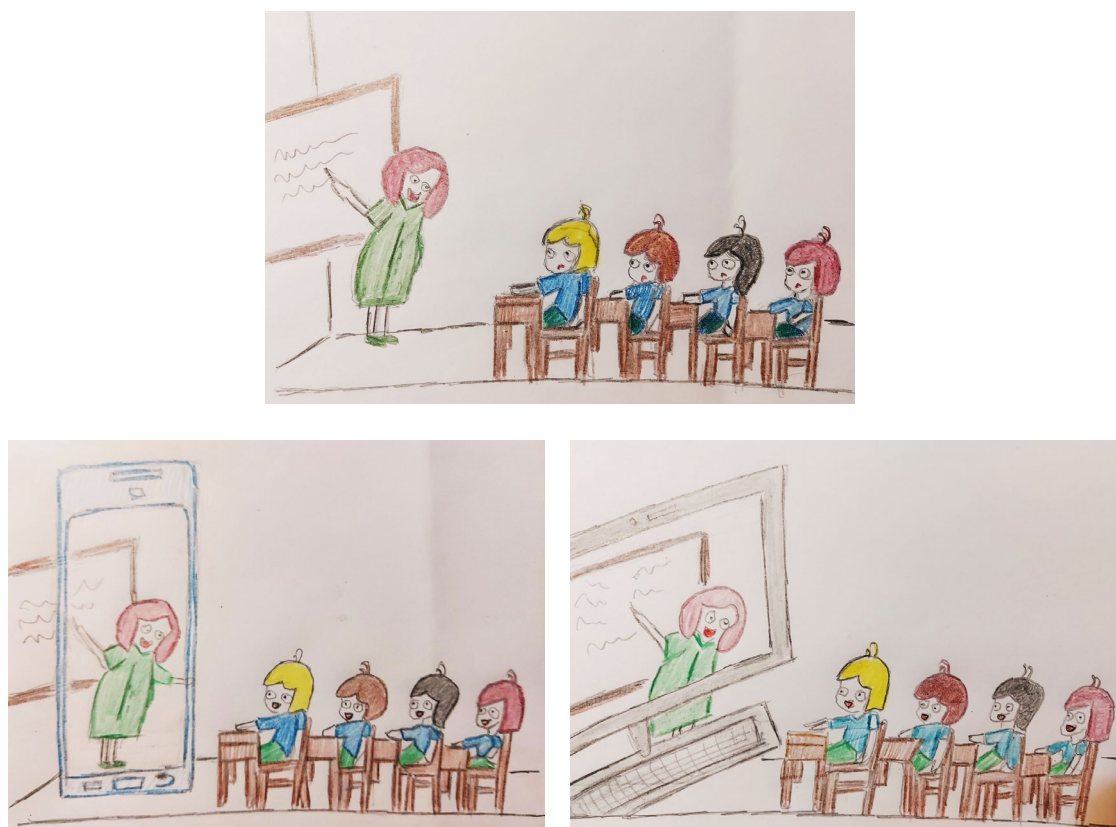


Figure 1. Initial enthusiasm for electronic communication in the educational process

5.2. How was the return to face-to-face communication?

After more than a year and a half of online teaching and learning, the first few days of physical attendance at school were accompanied by excitement, but also by the disobedience of getting up early in the morning, of allocating time to commute to college, of giving up doing several things at the same time as listening to the course. In addition, the face-to-face assessments and examinations led to very different reactions among students. From the perspective of the students involved in the study, the main advantages of online communication were:

- a significant improvement in the quality and quantity of available digital teaching materials;
- the possibility to follow courses from anywhere;
- no wasted time for travelling to attend classes;
- money are saved by not having to travel to classes;
- the possibility to record the course and listen to it repeatedly;
- use of the chat function of digital platforms by students and teachers during the course, facilitating teacher-student or student-student communication and interaction.

The main disadvantages of online communication from the perspective of the students involved in the study were:

- difficulties of concentration in the online educational process compared to face-to-face teaching;

- lack of socialization between students and between students and teachers;
- reduced attention and decreased of active participation in classes, as some students have other activities going on at the same time (see Figure 2);
- the retention to ask questions, to express opinions, to give answers when the course is recorded, due to the impression left, emotions, shyness or fear of being wrong;
- difficulties in learning and assimilating various fundamental or specialty subjects based on experimental or practical activities;
- initial difficulties for students and teachers unfamiliar with digital platforms and resources.

Virtual reality, augmented reality and virtual learning environments are changing the whole educational process of teaching and learning.



Figure 2. Posture while learning online (33 Memes about online Classes, 2020, p. 9)

6. Findings

Oral communication versus written communication has the advantage of immediate feedback, the receiver can ask for clarification, non-verbal language can be used, and the disadvantage is the lack of recording if unwanted or unable, and the greater probability of contradictory discussions.

Creative ideas to combat the negative effects of online-only communication:

- weekly meetings of students with each other and with teachers;
- for more productive online communication it is recommended that the first meetings of students and teachers take place face-to-face, and then move to online;
- challenge to sport, movement, enjoyable physical activities established in student meetings, beneficial to health but also to socialization, face-to-face communication;
- courses to learn techniques and skills on how to improve effectively online communication (for both students and teachers);
- combining methods of balancing digital technology with face-to-face teaching methods for maximum efficiency in the educational process.

Nonverbal language is interpreted differently in videoconferences than in face-to-face meetings. Technology has given birth to a new generation of communication platforms, where mastery of verbal and nonverbal language is an important requirement for a quality educational process. Thus, it is necessary to prepare students and teachers through courses for successful adaptation to communication technology in the educational system.

7. Conclusions

In the educational process, the face-to-face communication approach is undoubtedly effective; it leads to the strengthening of quality human relationships and represents a powerful form of human interaction. Digital technology cannot fully replace the face-to-face approach between teacher and students.

Sitting at the computer for long hours (homework plus online courses), using the phone, tablets every day affects health. However, by being aware of the negative aspects of overuse of digital technology and taking action, a middle way can be found to use digitisation without negative health consequences.

Nowadays, digital means have led to the abandonment of handwriting, although it has great benefits in the learning process. Online learning has led to an even greater shift away from handwriting.

Students like online learning but feel that it is a minus to face-to-face learning. A balance in the use of the two forms of communication would lead to the benefits of both online, virtual and face-to-face communication. The advantages of new technologies in education are endless. However, the effects on health and interpersonal relationships have to be taken into consideration.

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