Higher Education in the Face of Educational Paradigm Shifts–From Face-to-Face to Distance Learning

Janusz Gierszewski, Andrzej Pieczywok, and Wojciech Pietrzyński

Abstract Higher education has recently undergone changes in the didactics of education caused mainly by the COVID-19 pandemic. The vast majority of universities have changed the form of education from stationary to remote. Academic teachers and students have faced serious challenges in fulfilling their tasks when face-to-face communication is very difficult or impossible. The aim of the article was to find out students' opinions on the effectiveness of remote learning in the context of a change in the paradigm of education. In order to more fully understand the issue of the effectiveness of remote learning caused by the COVID-19 pandemic, a diagnostic survey method was used and the tool was a survey questionnaire. Responses from respondents were collected using Google Forms electronic form. The survey revealed that students rated the effectiveness of remote learning moderately. In their opinion, remote learning as a permanent form of education raises controversies and concerns. These concerns are due to the stability of the internet connection during remote classes both on the part of the lecturers and the students themselves and the moderate psychological support received from the university. The study was conducted in Poland during the COVID-19 pandemic, an emergency situation. Therefore, the authors do not usurp the right to construct conclusions from the research on a general level in normal conditions of student education.

Keywords Higher education · Learning theories · Learning paradigm · Remote education · Pandemic

J. Gierszewski (✉) · W. Pietrzyński
Pomeranian University in Slupsk, 76-200, Slupsk, Poland
e-mail: janusz.gierszewski@apsl.edu.pl

W. Pietrzyński
e-mail: wojciech.piestrzynski@apsl.edu.pl

A. Pieczywok
Kazimierz Wielki University, 85-064, Bydgoszcz, Poland
e-mail: a.pieczywok@wp.pl

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1 Introduction

The pandemic situation in terms of teaching in higher education has fundamentally changed the paradigm of education, as remote learning has gone from being a complementary form to being the primary one. In view of the pandemic situation caused by COVID-19, there was a rather significant change in the form of higher education–a shift from face-to-face teaching to distance learning. This situation caused many changes in higher education institutions. Classes started to take place in the form of teleconferences–via various communicators such as Zoom, Skype or Microsoft Teams–or homework assignments to be completed on your own. Many teachers and students were unable to use this form of teaching effectively. There were technical problems (limitations in the supply of Internet or too slow connection) and economic problems–the high cost of purchasing equipment and a professional platform, including the training of lec-turers. As a result, the lecturers could not properly control the quality of knowledge transfer as they were not able to respond to individual questions and needs of students [1].

Given the timing of the pandemic, there has also been a reorganisation of education among students in security-related courses.

The need to devote more time to the development of e-learning materials also proved problematic for students. This situation was further exacerbated by the lack of motivation and self-discipline among students to prepare for classes themselves. In addition, the inability to organise practical classes remotely became apparent. The challenge during the pandemic became the organisation of online examination sessions and the implementation of work placements. The COVID-19 pandemic and above all its media representations and the outbreak of collective hysteria also had an impact on stress and anxiety levels among students. Fatigue, burnout, monotony of the day leading to boredom are just some of these effects.

Therefore, the authors of this study are interested in the opinion of students on the effectiveness of remote education in the situation of a COVID-19 pandemic threat [2].

Moreover, the conclusions formulated in this way will contribute to the evaluation of the applied educational paradigm in higher education. They will also indicate the value of exemplary thinking and action of teachers.

In contemporary analyses of the content of education, it is worth considering the assumptions of multiparadigmality [3]. It is Thomas Kuhn's theory, revealing the variability of learning, that may prove useful in undertaking such a task. In the approach to education, in thinking about learning and teaching, it is worth revealing the diversity of approaches. Change should become a key issue in considering the process of education, and thus the principles and content of teaching.

To a large extent, the above considerations can provide an excellent platform for contemporary interpretations and research explorations of learning paradigms in remote education. They can also enrich diverse paradigms of the educational process. Recognising the wealth of potential hidden in information technologies in the form of means facilitating the elimination of the disadvantages of face-to-face education.

2 Research Methodology

The subject of the research was the analysis of remote education in the perception of students of security studies. The aim of the research was to find out students' opinions on the effectiveness of remote education in the context of education paradigms. The formulated main research problem as follows: How do students (of security studies) evaluate the effectiveness of remote studying in the area of acquired knowledge and shaped skills in the context of objectivity and subjectivity (corresponding teaching philosophy and learning philosophy)?

In addition to the main problem, specific problems were formulated:

Q.1 How would students rate the stability of the connection during remote classes?
Q.2 To what extent do students receive technical support from the university during remote learning?
Q.3 To what extent do students rate the psychological support during remote learning?
Q.4 How effective do students think distance learning is?
Q.5 How do students perceive remote learning as a permanent form of education?

The following research hypotheses were also adopted:

H. 1. Stability of connection during remote classes on the part of lecturers was high and moderate on the part of students.
H. 2. The university's technical support to students was very poor.
H. 3. The psychological support received from the university, students rated moderate.
H. 4. Students rate the effectiveness of distance learning moderately.
H. 5. Students perceive remote learning as a permanent form of education moderately positively.

In order to more fully understand the issue of the effectiveness of remote learning caused by the COVID-19 pandemic, a diagnostic survey method was used and the tool was a survey questionnaire. The questionnaire was developed by the research team of the Pomeranian Academy in Słupsk, Poland. Thanks to the introduction of the Likert scale, a possibility of graded evaluation of the phenomenon of obligatory distance learning was created for the respondents. Responses from respondents were collected using Google Forms electronic form. The collected data were processed using Microsoft Office package, descriptive statistics spreadsheets, ANOVA analysis of variance, Tukey post hoc test. The research was conducted on students of Security Studies at the Pomeranian Academy in Słupsk in the Republic of Poland (mainly from the northern region of the country). The criterion adopted was year of attendance (first, second and third year), as it was recognised that there may be significant differences in the perception of distance and in-person learning due to the previous experience of in-person learning experienced by older students.

3 Essence, Concepts and Teaching Principles of Remote Education

Generally speaking, remote learning (distance education) is a part of didactics and has many characteristics that characterise it. It is a systematically implemented didactic project that includes: methodical preparation, presentation of learning material and control of the learning process, as well as support for learners, most often without the direct participation of the teacher. The -project also includes new media, which by their planned use influence changes in learners.

When trying to provide a definition of distance education we come across many problems with different approaches to this category in the literature. The variety that occurs results both from the desire to accurately translate English terms, as well as is a manifestation of the desire to include in one category diverse forms of education united by the idea of increasing the availability of education to the greatest number of people.

It seems that a comprehensive problem of distance education, considering its main idea and changing technical conditions of its implementation was presented by Mirosław Kubiak. He points out that it is a method of conducting the teaching process in conditions when teachers and students are distant from each other and are not in the same place, using to transmit information, in addition to traditional ways of communication, also modern, very modern telecommunications technologies transmitting: voice, video, computer data and printed materials [4].

Distance learners are physically separated from the institution that delivers a particular course. In addition, the contract between the parties involved in the learning process requires that the teaching includes: the checking of learning outcomes, the provision of instructions for learning, the preparation of the learner for examinations and their conduct by the institutions organising the learning process. All this should be achieved through individual and group communication in the physical absence of the teacher [5].

The phenomenon of change is therefore not new in education, but it is of particular importance in distance learning because of the role that technology plays in it. The emergence of new communication tools causes an avalanche of changes in the form of new methods and forms of education, as well as the organisation of learning. Theory therefore has an important role to play in determining the mechanisms and processes that occur in the learning environment [6].

In distance education we observe many theoretical concepts. Desmond Keegan, in his work The Foundations of Distance Education [7] published in 1986, distinguishes three historical approaches: the theory of industrialization of teaching by Peters [8] in 1983; the theory of independence and autonomy by Wedemeyer [9] and Moore [10]; the theory of interaction and communication formulated by: Baath [11], Sewart [12], Daniel and Marquis [13] and Holmberg [14].

To the mentioned concepts it is worth adding another one, developed by Perraton [15], which is a synthesis of the mentioned theories of distance education and is a kind of education. The principles of multimedia learning are based on instructional

design and aim to minimise extraneous cognitive load and manage internal load. In instructional design, Richard E. Mayer and Roxana Moreno made partial use of the model developed by Baddeley and Hitch model of working memory and the resulting important conclusion about the parallel flow of information: visual and auditory.

Analysing the development of online learning, there is a clear trend towards the creation of learning principles. This has been fostered by emerging cognitive theories of education, which have paved the way for multifaceted explorations. One result is the emergence of an outline of principles for multimedia-supported online learning, presented by Clark and Mayer, among others.

Many lecturers and students claim that remote classes are less effective than so-called "contact classes". There are also many enthusiasts who believe that technological innovations are superior to "traditional" teaching. Certainly, the development of classes using remote learning has started a revolution in teaching. The conducted verification of learning outcomes does not always show a significant difference. Hence, it is worthwhile to find out students' opinions on remote learning.

4 Selected Theories of Education in a Digital World

Theories of distance learning include many approaches and views resulting from the adopted theoretical basis, such as humanistic or cognitive. The authors, due to a certain limitation of the framework of the article and the multiplicity of theories, decided on a simplified division of distance learning theories, which includes a historical approach.

Four fundamental theories were selected which have influenced the development of educational didactics today. In the group of concepts referred to as the historical approach, the following theories were presented: industrialisation of teaching, independence and autonomy, interaction and communication, and synthesis of historical theories.

One of the most relevant theoretical concepts of the twentieth century in distance education was based on the model of industrial production of distance education. Its creator, Peters, assumed that distance education could be analysed by comparison with industrial production of goods.

Peters characterises distance education as a method of transmitting knowledge, skills and attitudes that is rationalised by the use of division of labour and organisational principles and the extensive use of technical media. These means should be used to reproduce high quality teaching materials that enable instruction to be given to learners at the same time and in any place.

The use of well-defined learning objectives, as in the instructional design of the system, allowed the translation of the principles governing teaching–learning into concrete solutions to enhance the effectiveness and efficiency of distance education.

One of the pioneers of distance education, Wedemeyer [16], formulated the theory of learner autonomy (freedom in learning). It assumes the necessity of the occurrence of autonomy in learning. The aforementioned conditions of learning are today the

basis of a modern online educational system. It should be emphasized that Wedemeyer's way of thinking about distance education was in line with the principles of humanism postulated by didacticians and the proposals of andragogists.

Moore [17], who developed the concept of transactional distance, is also worth citing at this point. It combines both Otto Peters' view of distance learning as a highly organised mechanical system and Charles A. Wedemeyer, who emphasised the learner and his interactive relationship with the teacher.

One of the founders of the communicative interaction theory is Börje Holmberg. His theory assumes that distance learning is an interaction similar to a conversation between a learner and a teacher. Fundamental to this is the concept of so-called didactic conversation, which refers to both real and simulated conversation. In order to facilitate this, Holmberg has developed a didactic guide.

He based his theory on correspondence communication between teacher and learner and the industrial organisation of the learning process. He assumed that learning can only occur when: the learner is active, the focal point of education is the learning process and communication, learning takes place in a planned manner under the supervision of the educational organisation.

Holmberg believes that the basis of distance learning is the interaction between teacher and learner. Central to this are motivation and empathy, as well as autonomy and communication. The simulated interactions that occur in a substantive conversation can develop thinking, create conditions for different views and approaches to clash and enable solutions to be sought to existing problems.

A characteristic feature of the communicative interaction theory is the absence of direct teacher supervision of the class and the teacher's absence during the learning process. Simulating a conversation (conversation) involves learners working with text contained in instructional materials.

The concept of synthesis of existing theories has been proposed by Hilary Perraton, who bases her idea on the combination of different concepts by choosing 5 covers the ways of distance learning, another 4 refer to the need to intensify the dialogue and the last 5 deal with making it a method.

Many studies compare the effectiveness of traditional "contact" learning with that of new technologies, the most recent of which are differentiated forms of digital distance learning. Therefore, in the opinion of the authors of this article, it is assumed that in the level of acquired knowledge there are no significant differences in the effectiveness of learning in the framework of "contact" education with distance learning using electronic media. Thanks to the conducted research, we have feedback on remote learning in security-related fields of study.

It is well known that highly rated classes result in greater learning efficiency. However, this correlation depends on a number of variables. We assumed that it depends on, among other things, the stability of the internet connection, technical and psychological support from the university.

5 Analysis of Test Results

The results of our own research and verification of the working hypotheses are presented below (Tables 1 and 2).

Verification of H. 1. Stability of connection during remote classes on the part of lecturers was high and moderate on the part of students.

The hypothesis was completely unconfirmed. Students rated their own internet connection stability low (M = 2.47), with first-year students rating it lowest (M = 2.00). At the same time, second and third year students rated slightly higher (M = 2.84; M = 2.47). Despite this, the evaluation of first-year students is significantly different from that of second- and third-year students ($p < 0.01$). An even greater inconsistency between assumptions and reality was found in the evaluation of the stability of the Internet connection on the part of the lecturers, (low rating; M = 2.21; M-I = 1.84; M-II = 2.63; M-III = 2.34). In the pair of internal treatments, significant differences were found between the first and second and third years of study ($p < 0.01$) (Table 3).

Verification H. 2. The university's technical support to students was very poor.

Working hypothesis 2 was not confirmed. The students experienced moderate technical support from the university during remote learning. They rated the above support moderately (M = 3.76; M-I = 4.13; M-II = 3.40; M-III = 3.56), where significant differences were found within the study group between the first year and the second and third years ($p < 0.01$) (Table 4).

Verification of H. 3. The psychological support received from the university, students rated moderate.

Hypothesis 3 was confirmed. Students rated psychological support moderately (M = 3.56; M-I = 3.91; M-II = 3.10; M = III = 3.52). The internal group measurement allows us to conclude that there are statistically significant differences only between the first and second year of study ($p < 0.01$) (Table 5).

H. 4. Students rate the effectiveness of distance learning moderately.

Hypothesis 4 was fully confirmed. This is evidenced by the following results (M = 3.67; M-I = 4.13; M = II = 3.19; M-III = 3.49). At the same time, significant differences were found between the assessment of the effectiveness of distance learning made by first-year students and second- and third-year students ($p < 0.01$) (Table 6).

H. 5 Students perceive remote learning as a permanent form of education moderately positively.

Hypothesis 5 was partially confirmed. Only first-year students perceived remote learning in a moderately positive way (M-I = 3.54) The others rated it low (M-II = 2.75; 2.77; M = 3.09). Hence, significant differences were found within the study group between the first year and the others ($p < 0.01$).

Table 1 Descriptive statistics, results of analysis of variance, Tukey's post hoc test for the variable stability of connection during remote activities by students

Group	N	Min.	Max.	M	SD
First year of studies	81	1	5	2.00	0.84
Second year of studies	57	1	5	2.84	0.88
Third year of studies	53	1	5	2.79	0.96
Total	191	1	5	2.49	0.97
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Source	SS	df	MS	Test F	p
Between groups	31.29	2	15.65	19.83	$p < 0.01$
Within groups	148.29	188	0.79		
Total	179.59	190			
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Comparative pairs	Tukey HSD Q statistics	Tukey HSD p-values Q	Materiality level	----------	----------
1st year versus 2nd year	7.76	0.001	$**p < 0.01$	----------	----------
1st year versus 3rd year	7.14	0.001	$**p < 0.01$	----------	----------
2nd year versus 3rd year	0.41	0.899	Irrelevant	----------	----------

Source own elaboration

Table 2 Descriptive statistics, results of analysis of variance, Tukey post hoc test for the variable stability of connection during remote classes by lecturers

Group	N	Min.	Max.	M	SD
First year of studies	81	1	5	1.84	0.84
Second year of studies	57	1	5	2.63	0.83
Third year of studies	53	1	5	2.34	0.91
Total	191	1	5	2.21	0.92
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Source	SS	df	MS	Test F	p
Between groups	22.13	2	11.06	14.85	$p < 0.05$
Within groups	144.06	188	0.74		
Total	162.19	190			
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Comparative pairs	Tukey HSD Q statistics	Tukey HSD p-values Q	Materiality level	----------	----------
1st year versus 2nd year	7.50	0.001	$**p < 0.01$	----------	----------
1st year versus 3rd year	4.63	0.003	$**p < 0.01$	----------	----------
2nd year versus 3rd year	2.50	0.118	Irrelevant	----------	----------

Source own elaboration

Table 3 Descriptive statistics, results of analysis of variance, Tukey post hoc test for the variable technical support of students from the university

Group	N	Min.	Max.	M	SD
First year of studies	81	1	5	4.13	0.85
Second year of studies	57	1	5	3.40	0.84
Third year of studies	53	1	5	3.56	1.06
Total	191	1	5	3.76	0.96
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Source	SS	df	MS	Test F	p
Between groups	20.68	2	10.33	12.44	$p < 0.05$
Within groups	156.24	188	0.83		
Total	176.92	190			
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Comparative pairs	Tukey HSD Q statistics	Tukey HSD p-values Q	Materiality level	----------	----------
1st year versus 2nd year	6.57	0.001	$^{**}p < 0.001$	----------	----------
1st year versus 3rd year	5.00	0.001	$^{**}p < 0.001$	----------	----------
2nd year versus 3rd year	1.32	0.610	Irrelevant	----------	----------

Source own elaboration

Table 4 Descriptive statistics, results of analysis of variance, Tukey post hoc test for the variable psychological support of students by the university

Group	N	Min.	Max.	M	SD
First year of studies	81	1	5	3.91	0.94
Second year of studies	57	1	5	3.10	1.01
Third year of studies	53	1	5	3.52	0.99
Total	191	1	5	3.56	1.02
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Source	SS	df	MS	Test F	p
Between groups	21.96	2	10.98	11.53	$p < 0.05$
Within groups	178.97	188	0.95		
Total	200.93	190			
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Comparative pairs	Tukey HSD Q statistics	Tukey HSD p-values Q	Materiality level	----------	----------
1st year versus 2nd year	6.77	0.001	$**p < 0.01$	----------	----------
1st year versus 3rd year	3.16	0.068	Irrelevant	----------	----------
2nd year versus 3rd year	3.21	0.062	Irrelevant	----------	----------

Source own elaboration

Table 5 Descriptive statistics, results of analysis of variance, Tukey post hoc test for the variable students' evaluation of the effectiveness of distance education

Group	N	Min.	Max.	M	SD
First year of studies	81	1	5	4.13	0.81
Second year of studies	57	1	5	3.19	1.21
Third year of studies	53	1	5	3.49	0.99
Total	191	1	5	3.67	1.07
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Source	SS	df	MS	Test F	p
Between groups	32.24	2	16.12	16.15	$p < 0.05$
Within groups	187.63	188	0.99		
Total	219.87	190			
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Comparative pairs	Tukey HSD Q statistics	Tukey HSD p-values Q	Materiality level	----------	----------
1st year versus 2nd year	7.72	0.001	$**p < 0.01$	----------	----------
1st year versus 3rd year	5.17	0.001	$**p < 0.01$	----------	----------
2nd year versus 3rd year	2.20	0.265	Irrelevant	----------	----------

Source own elaboration

Table 6 Descriptive statistics, results of analysis of variance, Tukey post hoc test for the variable perception of remote education students as a permanent form of education

Group	N	Min.	Max.	M	SD
First year of studies	81	1	5	3.54	1.12
Second year of studies	57	1	5	2.75	1.35
Third year of studies	53	1	5	2.77	1.20
Total	191	1	5	3.09	1.27
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Source	SS	df	MS	Test F	p
Between groups	28.36	2	14.18	9.59	$p = 0.0001$
Within groups	277.94	188	1.48		
Total	306.30	190			
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Comparative pairs	Tukey HSD Q statistics	Tukey HSD p-values Q	Materiality level	----------	----------
1st year versus 2nd year	5.30	0.001	$**p < 0.01$	----------	----------
1st year versus 3rd year	5.06	0.001	$**p < 0.01$	----------	----------
2nd year versus 3rd year	0.12	0.899	Irrelevant	----------	----------

Source own elaboration

6 Conclusions

Synchronous teaching, called “remote”, consists of students and lecturers attending classes at the same time, but outside the lecture hall, and their contact is usually in the form of videoconferencing.

However, the most useful in evaluating the effectiveness of distance learning seems to be the constructivist theory, which takes a more creative approach. The student is treated in this paradigm as an active and independent participant, who, using the information and experiences he has previously acquired, deepens his knowledge. The most important role in this type of teaching is played by programs enabling real-time conversations (e.g. Microsoft Teams, Meet, Zoom, Google Class-room or ClickMeeting).

The assumed assumption that there are no significant differences in the level of acquired knowledge in the effectiveness of "contact" learning with distance learning using electronic media has turned out to be not entirely true due to several regularities. In remote learning, one should keep in mind:

1. Internet connection stability.
2. Technical support from the university.

Thus, a significant shortcoming of remote education is the quality of equipment and internet connections of students and lecturers. In order to compare the effects of the learning process, it should be assumed that the basic methods of education must be the same with these variants (hypothesis 1 and 2). In other words, if the same graphical and verbal elements occur in “contact” learning, they must occur in the same shape in “remote” learning and without technical interference. This is because the learning process is a psychological (hypothesis 3) component of active learning based on the constructivist paradigm, occurring independent of the medium that is used. Therefore, it is important for universities to reflect on the choice of modes of communicating with students, i.e., which one can be used to enhance effective learning. It would also be helpful to indicate the choice of subjects (recommended by academic teachers and students), which are possible to implement remotely without “losing” the quality of the verification of learning outcomes (subjects of theoretical and practical character).

What used to be considered different and separate in the learning process is now very similar (hypothesis 4) Despite appearances, distance classes are not new. The study found that there is no noticeable difference between “face-to-face” and “remote” classes.

Time will tell (hypothesis no. 5) when the differences between remote and “contact” learning will become blurred (we assume that soon). It is certainly necessary to increase the teaching offer for students related to remote working.

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