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MIXED CLASS TEACHING AS AN EMERGING TREND ACCELERATED BY COVID-19

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Abstract. *The COVID-19 pandemic has essentially accelerated the pace of the teaching transformation. Mixed (also hyflex) class teaching has become indispensable in medical, engineering, teacher and other fields of education when only online teaching is not enough to ensure the continuity of the instruction. The research aim is to identify scenarios of mixed class teaching underpinning the elaboration of implications for higher education. The present research used both - theoretical and empirical methods. The theoretical methods included the analysis of scientific literature, theoretical modelling, systematisation, synthesis, comparison, and generalisation. The empirical study carried out in June 2021 was exploratory. Data were collected through the analysis of published studies. The collected data were processed via content analysis. The present research allows concluding that teaching has undergone significant changes in different historical periods. The findings of the empirical study facilitate the conclusion on the existence of two scenarios of mixed class teaching, namely HOT (Here or There) and COIL (Collaborative Online International Learning). Both scenarios are oriented to students' learning, teaching in these scenarios is neither segmented nor structured. The novel contribution of the research is revealed in the implications on mixed class teaching for higher education. Future research work was proposed.*
Keywords: *COVID-19, Educational Process, Hyflex (Hybrid Flexible) Class Teaching, Mixed Class, On-campus Students, Remote Students' Teaching, Teaching Sub-Phases.*

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Introduction

Since many years, teaching remains an important part of education despite contemporary foci on peer-learning and learning in education and training (Ahrens, Zaščerinska, Lange, & Aļeksejeva, 2021).

The COVID-19 pandemic stimulated simultaneous delivery of a face-to-face course to on-campus and remote off-campus students (White, Ramirez, Smith, & Plonowski, 2010) or, in other words, mixed class teaching, also known as hyflex (hybrid flexible) class teaching (Aleksejeva, Zascerinskis, Abjalkiene, Gukovica, Zascerinska, & Ahrens, 2021).

Analysis of the existing literature reveals exploratory and qualitative nature and focus of the previously done research (Raes, Detienne, Windey, & Depaepe, 2020). Mostly, descriptions of students' experiences, the organisational implementation and the technological design were investigated (Raes, Detienne, Windey, & Depaepe, 2020). Empirical studies have only begun to emerge, and more research is needed into different pedagogical scenarios and their impact on student outcomes (Raes, Detienne, Windey, & Depaepe, 2020).

The research aim is to employ theoretical and empirical methods for the identification of scenarios of mixed class teaching underpinning the elaboration of implications for higher education.

The present research employs both - theoretical and empirical methods. The theoretical methods include analysis of scientific literature, theoretical modelling, systematisation, synthesis, comparison, and generalisation. The empirical study was exploratory. Data were

collected through the analysis of published studies. The content analysis for processing the collected data was carried out. The novel contribution of the research is revealed in implications on mixed class teaching for higher education.

Conceptual Framework

Education is widely recognised to be a process (Ahrens, Zaščerinska, Lange, & Aļeksejeva, 2021). This process is broadly defined as the educational process (Zaščerinska, Zaščerinskis, Andreeva, & Aļeksejeva, 2013). The other terms of the educational process include educational processes (Smidt, 2015), educational practice(s) (Murphy, 2013), educative process (Judd, Bagley, Kilpatrick, Moore, & Chassell, 1923), education as process (Creasy, 2018), the process of education (Bruner, 1960), educational technology (Thota, & Negreiros, 2015), and similar. The educational process is implemented in a certain sequence as depicted in Figure 1: from teaching in Phase 1 through peer-learning in Phase 2 to learning in Phase 3 (Ahrens & Zaščerinska, 2010, p. 185). The educational process sequentially proceeds (Zaščerinska, 2011, p. 105–106):

- Phase 1 Teaching is aimed at a safe environment for all the learners. In order to provide a safe environment, the essence of constructive social interaction and its organizational regulations are considered by both the teacher and learners. The present phase is organized in a frontal way involving the learners to participate.
- Phase 2 Peer-Learning is designed for the learners' analysis of an open academic problem situation and their search for a solution. The same materials can be prepared for all of the class/group learners. This phase involves the learners to act in peers.
- Phase 3 Learning emphasizes the learners' self-regulation with the. use of assessment of the process and self-evaluation of the results.

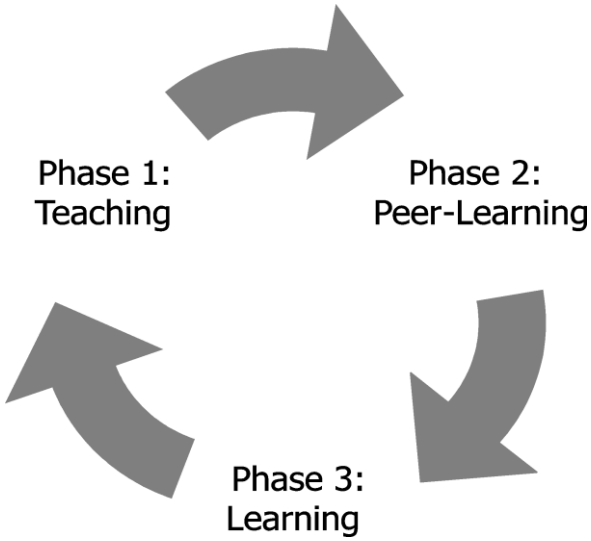


Figure 1 ***The phases of the educational process*** *(Ahrens & Zaščerinska, 2010, p. 185)*

The present research mainly focuses on teaching. Teaching is the first phase in the educational process (Zaščerinska, 2013). Figure 2 reveals the relationships between education as the macro-environment, educational process as the mezzo-environment, as well as teaching, peer-learning and learning as the micro-environment.

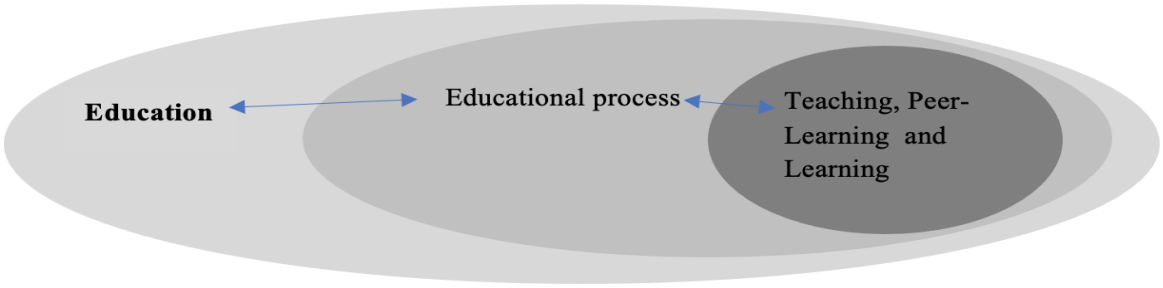


Figure 2 ***The relationship between education, educational process, teaching, peer-learning and learning*** *(the authors)*

Table 1 gives an overview on the teaching development in different historical periods.

Table 1 ***Teaching development in different historical periods*** *(the authors)*

Historical period	Teaching definition	A short description of teaching	Reference
40 000 years ago	Teaching by the people (people teaching)	Simple pedagogical views and ideas that were most fully manifested in labor activity, traditions, rituals, customs, games, holidays, oral folk speech	Amirov, Kudashkina, & Lipatova, 2017, p. 18
over 2000 years ago	Teaching as the effective strategy for learning	What kind of learning is desired and toward what ends by the Greek philosophers, Socrates (469 –399 B.C.), Plato (427 – 347 B.C.), and Aristotle (384 – 322 B.C)	Hammond, Austin, Orcutt, & Rosso, 2001, p. 3
500 A.D. to 1500 A.D.	Teaching at religious schools	Transmission-based teaching from the priest to the people	Monroe, 1925
15th to the 17th century, The Renaissance	Teaching for thinking	For thinking – the effort to understand ideas and use knowledge for broader purposes	Hammond, Austin, Orcutt, & Rosso, 2001, p. 4
18th century	Teaching and learning	The unity of teaching and learning	Zakirova, Grigoryeva, & Kayumova, 2018, p. 7
19th century	Teaching from the psychological perspective	Behaviorist vs. cognitive psychology: the scientific study of learning for searching the best approach to teaching	Hammond, Austin, Orcutt, & Rosso, 2001, p. 5
20th century	Teaching and peer-learning	Teachers and peers assist learners in developing new ideas and skills	Vygotsky, 1934/1962
21st century	Teaching, peer-learning and learning	The unity of teaching, peer-learning and learning	Ahrens & Zaščerinska, 2010, p. 185
	Information and Communication Technology enhanced teaching	Teaching with the use of Information and Communication Technology, digitalized teaching and similar	Zaščerinska, 2009; Melnikova, Grünwald, Ahrens, Pfaffenberger, & Zaščerinska, 2017
The COVID-19 pandemic in the 21st century	Mixed class teaching	Simultaneous teaching of a class of both on-campus and remote learners	White, Ramirez, Smith, & Plonowski, 2010

The COVID-19 pandemic has essentially accelerated the pace of the transformation of the educational process (Ahrens, & Zascerinska, 2020). Almost overnight, the pandemic has shifted the delivery of education to only online teaching (Ahrens, Zascerinska, Bhati, Zascerinskis, Aleksejeva, 2021) done from home. With warnings of the next COVID-19 wave and other impending pandemics, universities need to be prepared to deliver courses in alternative ways to ensure continuity of instruction (White, Ramirez, Smith, & Plonowski, 2010). It should be pointed that not all teaching can be done fully online. For example, the shift to online platform poses serious challenges to medical education (Jiang et al, 2020). Expressly, most medical schools set students in physical settings for 1–3 years where their knowledge foundations are built; students' physical presence in both inpatient and outpatient settings has been a successful practice of early clinical immersion experiences and the clerkship curriculum (Jiang et al, 2020). The second half of medical school education requires students to participate in clinical rotations, sub-internships, and/or research projects (Jiang et al, 2020). The same refers to many other educational fields. Among many, there is teacher education, engineering education, maritime education, and others, too.

Figure 3 illustrates a simultaneous delivery of a face-to-face course to on-campus and remote off-campus students (White, Ramirez, Smith, & Plonowski, 2010) or, in other words, mixed class teaching.

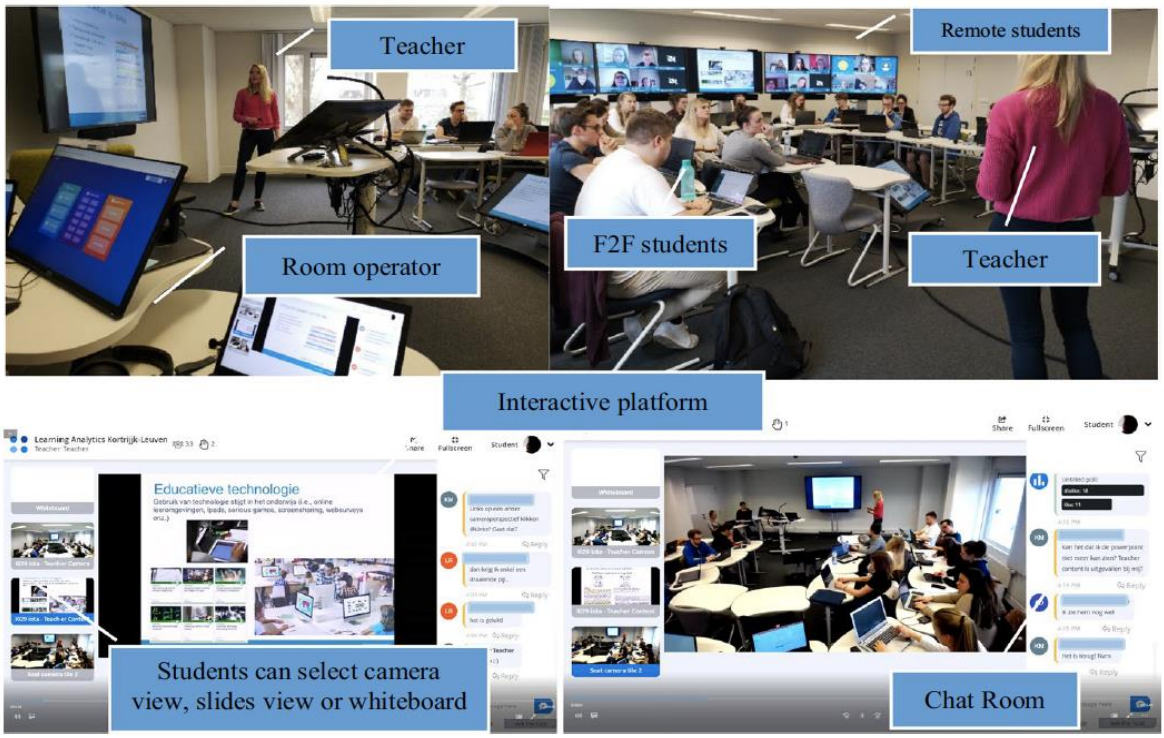


Figure 3 ***Mixed class including both on-campus (F2F) and remote individual students (upper pictures) and the platform visible for the students (lower pictures)***
(Raes, Detienne, Windey, & Depaepe, 2020)

For comparative purposes, Table 2 demonstrates the differences in the use of the selected terms containing "mixed", "class" and "teaching" and similar terms.

Table 2 ***Use of selected terms containing "mixed", "class" and "teaching"*** *(the authors)*

Term	***Term's meaning***	***Reference***
Mixed teaching mode	The mix of online and offline teaching	Xie, 2020
Hybrid teaching mode		Sun, 2020
Blended method		Setyawan, 2019
Teaching mixed ability classes	Students with mixed abilities in a class	Djurayeva, 2021
Teaching of a mixed aged / level class	Students of different ages / levels in a class	Smit & Engeli, 2015
Mixed classroom	A class environment in a formal education setting that includes both Heritage-Learners (HL) and second-language learners (L2)	Morgan, 2017
Mixed (also known as hyflex) class teaching	Teaching as part of the educational process in formal education settings that is simultaneously addressed to both – on-campus and remote learners	Aleksejeva, Zascerinskis, Abjalkiene, Gukovica, Zascerinska, & Ahrens, 2021

By a scenario, an approach to assess the future is meant (Sardesai, Stute, & Kamphues, 2021). It should be noted that approach means a set of theoretical principles (Karapetjana, 2008). A principle is defined as a shared combination of beliefs and assumptions that determine researchers' attitude to the world, their behaviour's norms and activities (Zaščerinska, Ahrens, & Bassus, 2015). Also, a principle is a condition of activity (Beļickis et al., 2000). A condition means a circumstance from which the implementation of a process, process or activity depends (Beļickis et al., 2000). In the present research, mixed class teaching depends on the inter-relationships between the teacher and learners. For the purposes of the present research, the use of the theoretical methods applied to the work of Sardesai, Stute, and Kamphues (Sardesai, Stute, & Kamphues, 2021), allows the authors of this contribution to define a pedagogical scenario as the description of an educational situation (environment) casually inter-related with the dynamic process of teaching. It should be pointed that a pedagogical scenario focuses on the creation of a coherent process that is adjusted to the learners' needs (Zogla, 2018). Teachers and learners follow different aims and motives, use different background knowledge and tools, and still their attempts have to be met (Zogla, 2018). This "joint venture" allows for transitions from a normative to a learner learning-centred process with the learners' meaningful participation in creating, conducting and evaluating the process where the learner has to achieve; that is leading to learners' autonomy in learning and development, as well as to teachers', learners', and other stakeholders' overcoming the growing complexity and transferring their way of thinking (Zogla, 2018). Educational situation (environment) is based on social interactions (Ahrens, Foerster, Zaščerinska, & Wasser, 2020). By interaction, obvious or non-obvious influence on each other in the process of implementing a joint activity (Ņikiforovs, 1994) is understood.

The normative scenario focusing on "How can a specific goal be achieved?" (Boerjeson, Hoejer, Dreborg, Ekvall, &. Finnveden, 2006) will be considered in the present work.

The overall goal of education is the enhancement of learner's experience, namely knowledge, skills and attitude (Ahrens, Zaščerinska, Hariharan, & Andreeva, 2016). The educational process is discussed to be effective to reach this goal (Hariharan, Zaščerinska, & Zaščerinskis, 2014).

The educational process is conventionally organized as a lecture, class, or lesson in education (Zaščerinska, 2013). In its turn, class is based on the system of learners' groups

(Zaščerinska, 2013). Organization of teaching as part of the educational process depends on the class's structure (Zaščerinska, 2013):

- if teaching is the only form within the class, the organization of mixed class teaching coincides with the lecture's structure,
- if mixed class teaching does not coincide with the class's structure, the class is part of teaching.

In the present research, the organization of teaching does and does not coincide with the class structure (Zaščerinska, 2013). It depends on a number of lectures in the semester, learners' age, learners' level of education, etc. Hence, teaching is defined as a class component and a certain system with its own structure (Zaščerinska, 2013).

Teaching as the 1st phase in the educational process has a particular significance as teaching facilitates teachers' and learners' creation of new products, new patents, new entrepreneurial activities and new jobs (Ahrens et al, 2021).

Teaching in formal education is defined as a purposefully organized process of teacher's sharing experience (knowledge, skills and attitudes) with learners (Zaščerinska & Ahrens, 2013). Teaching in Phase 1 was differentiated into two sub-phases (Zaščerinska, 2013): Teaching in Phase 1.1. and Teaching with the elements of peer-learning in Phase 1.2. as illustrated in Figure 4.

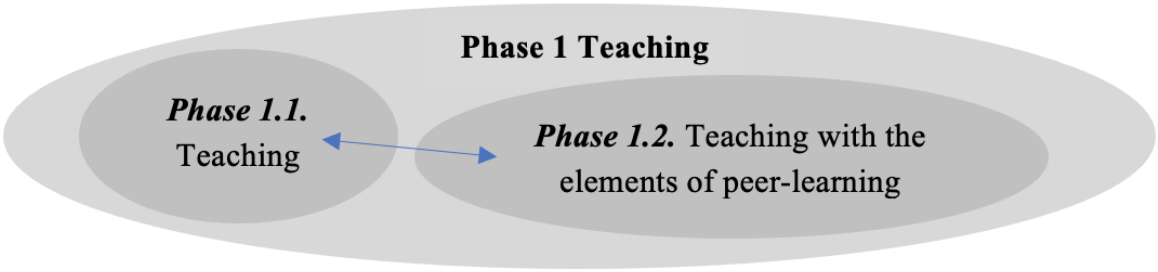


Figure 4 ***The relationship between teaching and its two sub-phases*** *(the authors)*

Methodology

Methodology is defined as a system of principles, practices, and procedures applied to any specific branch of knowledge (Karapetjana, 2008). The course of the implementation of the empirical study shows how the steps of the process are related following a logical chain.

The empirical study was enabled by the research question: How to organise mixed class teaching? The purpose of the study was to analyse mixed class teaching experiences. It should be noted that experiences at different universities follow different traditions, approaches, cultural contexts (Zogla & Lubkina, 2020).

The empirical study was carried out in June 2021. The empirical study was exploratory. Here the exploratory relates to being open at the outset of the study (Ahrens, Zascerinska, Bhati, Zascerinskis, & Aleksejeva, 2021). The exploratory methodology was chosen (Ahrens, Foerster, Zaščerinska, Wasser, 2020), as

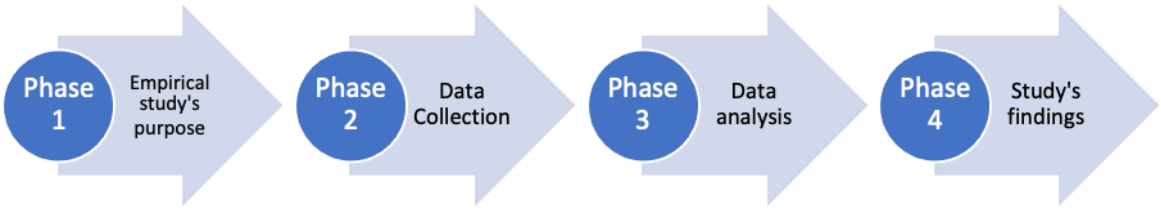
- on the one hand, the addressed phenomenon, namely mixed class teaching, requires more research into different pedagogical scenarios and their impact on student outcomes (Raes, Detienne, Windey, & Depaepe, 2020), and
- on the other hand, an exploratory study is characterised by a high degree of flexibility as well as a lack of formal structure and aims to identify the boundaries of the social environment, namely mixed class teaching, based on social interactions.

Data were collected through the analysis of published studies on the theme of the present research, namely mixed class teaching. Data were collected through reviewing, analysing, comparing and synthesising experiences from observations and interviews as well as in the literature on the theme in "an integrated way such that new frameworks and perspectives on the topic are generated" (Torraco, 2005, p 356). The content analysis for processing the collected data was carried out. The content analysis was differentiated into structuring content analysis and summarising content analysis (Mayring, 2014). Structuring content analysis means data categorising based on the previously defined criteria (Budde, 2005). Summarising content analysis tends to preserve the essential contents in a manageable short text (Mayring, 2004).

The processed data were interpreted. The researcher is the interpreter (Ahrens, Purvinis, Zaščerinska, Micevičienė, & Tautkus, 2018). The interpreter reveals his/her interest in a phenomenon (Zascerinska, Aleksejeva, Zascerinskis, Gukovica, & Aleksejeva, 2020) as well as practical interest in the research question (Cohen, Manion, & Morrison, 2003). The interpretive paradigm is aimed at analysing the social construction of the meaningful reality (Zascerinska, Aleksejeva, Zascerinskis, Gukovica, & Aleksejeva, 2020). Meanings emerge from the interpretation (Zascerinska, Aleksejeva, Zascerinskis, Gukovica, & Aleksejeva, 2020).

Figure 5 highlights the key steps of the empirical study and the sequence of their implementation.

Figure 5 ***The key steps of the empirical study and the sequence of their implementation*** *(the authors)*



Results of the Empirical Study

The analysis of the published studies reveals the comparison of two scenarios, namely the Remote Classroom and the Hybrid Virtual Classroom (Raes, Detienne, Windey, & Depaepe, 2020) as displayed in Figure 6.

The Remote Classroom **The Hybrid Virtual Classroom**

Figure 6 ***Two models of synchronous hybrid learning*** *(Raes, Detienne, Windey, & Depaepe, 2020)*

The picture on the left in Figure 6 depicts what is called the Remote Classroom, whereas the picture on the right depicts the Hybrid Virtual Classroom (Raes, Detienne, Windey, & Depaepe, 2020). Both learning settings have in common that both on-site or 'here' students and remote or 'there' students are simultaneously included (Raes, Detienne, Windey, & Depaepe, 2020). This kind of learning and instruction is also framed as Here or There (HOT) instruction (Zydney, McKimm, Lindberg, & Schmidt, 2019). The difference between the Remote and the Hybrid Virtual Classroom involves the location where students follow the lecture or class (Raes, Detienne, Windey, & Depaepe, 2020). In the Remote Classroom setting, one group follows the course on campus and another group follows the course synchronously from another campus (the remote location and students are displayed on the screen depicted in the left corner of Figure 6) (Szeto & Cheng 2016). In the Hybrid Virtual Classroom, one group follows the course on campus and simultaneously individuals follow the course remotely from the location of their choice (Butz, Stupnisky, Pekrun, Jensen, & Harsell, 2016). This method of teaching offers even more flexibility because it gives learners, as well as students who are, for example, abroad or ill for a longer period of time, the opportunity to participate in the actual lesson and interact at a distance with all students and the teacher from a place of their own choice (Raes, Detienne, Windey, & Depaepe, 2020).

Another scenario received the name Collaborative Online International Learning (COIL) (Ahrens et al, 2021). COIL connects students and professors in different countries for collaborative projects and discussions as part of their coursework. COIL Collaborations between students and professors provide meaningful, significant opportunities for global experiences built into the programs of study. COIL enhances intercultural student interaction through proven approaches to meaningful online engagement, while providing universities a cost-effective way to ensure that their students are globally engaged. COIL offers a creative, relevant, accessible way of engaging in international teaching and learning (Ahrens et al, 2021). Partners working on COIL programmes can share content and methodology, in mutually beneficial ways (Ahrens et al, 2021). Collaboration of students from a university in the USA and a partner university in South Africa served as the COIL illustration (Ahrens et al, 2021).

Empirical Study's Findings

The structuring content analysis of the data collected within the present empirical study allows identifying the scenarios of mixed class teaching reflected in Table 3.

Table 3 ***Scenarios of mixed class teaching*** *(the authors)*

Scenario	Sub-scenario	A short description of the scenario
HOT (Here or There)	Remote Classroom	One group follows the course on campus and another group follows the course synchronously from another campus
	Hybrid Virtual Classroom	One group follows the course on campus and simultaneously individuals follow the course remotely from the location of their choice
COIL (Collaborative Online International Learning)		Students and professors in different countries are connected for collaborative projects and discussions as part of their coursework

Table 4 highlights the differences between the scenarios of mixed class teaching.

The structuring content analysis of both scenarios – HOT and COIL – does not allow segmenting the organisation of teaching. In the HOT scenario, a group follows the course (Szeto & Cheng 2016; Butz, Stupnisky, Pekrun, Jensen, & Harsell, 2016), while the COIL scenario

puts the emphasis on students' learning as it is highlighted in the name of the scenario. Consequently, both scenarios are aimed at students' learning.

Table 4 ***Scenarios of mixed class teaching*** *(the authors)*

Scenario	**Sub-scenario**	**Mixed class teaching components**		
		Teacher	**Students**	**Language of instruction**
HOT (Here or There)	Remote Classroom	One teacher in one of the campus classes	2 groups of students from 2 different locations	One official language (used by the study programme) for the teacher and learners
	Hybrid Virtual Classroom	One teacher in the campus class	One group of students in the campus class, the others remotely from the location of their choice	One official language (used by the study programme) for the teacher and learners
COIL (Collaborative Online International Learning)		A couple of teachers from different countries	Students are from at least 2 countries, each of 2 students' groups is in the campus class, these 2 students' groups are connected via the Internet.	An international language is used for both teachers' and students' communication in the COIL class

The summarizing content analysis results in the finding that in both scenarios (HOT and COIL) social interactions between the teacher and students as the basis of mixed class teaching are not structured.

Conclusions

The theoretical findings of the present research allow concluding that teaching has undergone significant changes in different historical periods. Another conclusion based on the concepts' comparative analysis is drawn on the differences in the use of the selected terms containing "mixed", "class" and "teaching" and similar terms.

The findings of the empirical study facilitate the conclusion on the existence of two scenarios of mixed class teaching, namely HOT and COIL. Both scenarios are oriented to students' learning, teaching in these scenarios is not segmented and structured. The structure of mixed class teaching is to be based on social interactions between the teacher and students, namely, two sub-phases of teaching.

Implications for higher education imply that mixed class teaching is part of the educational process. The contemporary emphasis on peer-learning and/or learning in the modern education has to be shifted to the consideration of the educational process as a whole: the educational process is composed of the defined phases, namely teaching, peer-learning and learning. These three phases of the educational process, namely teaching, peer-learning and learning, proceed in a certain sequence: from teaching through peer-learning to learning. Teaching is the first phase in the educational process that increases the importance of the implementation of teaching within the whole educational process. In mixed class teaching, the inter-relationship or, in other words, social interaction between the teacher and learners is structured: teaching consists of two sub-phases, namely teaching and teaching with the elements of peer-learning.

The present research has some limitations. A limitation is the theoretical interconnections between mixed class teaching and scenarios. Another limitation is that the data were collected through the analysis of published studies on the theme of the present research, namely mixed class teaching. Also, the methods of data processing, namely the structuring content analysis and the summarising content analysis, serve as a limiting parameter in this research.

Future work will be aimed at expanding the theoretical interconnections of the present research, namely mixed class teaching and scenarios. Discovery of other scenarios of mixed class teaching will be continued. Modelling of mixed class teaching is proposed, too. Also, the search for methods of data collection and processing will be widened. Empirical studies focused on the analysis of mixed class teaching implemented in two sub-phases, namely teaching and teaching with elements of peer-learning, will be carried out. Comparative studies of different countries are of great research interest.

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