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4C-based learning model as an effective tool in language classrooms: the case of Kazakh schools

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Abstract: The 4C-based learning model aims to develop students' communication, collaboration, critical thinking and creativity skills. These skills have been recognised by educators as essential elements in training successful professionals. However, a preliminary review of school curricula concluded that the 4C model is poorly applied, and the main focus is still on subject knowledge. For this reason, this study aims to develop and describe teaching strategies that could integrate the 4C model into a language learning process. As the main teaching method, cooperative learning was shown in teamwork, games, and case studies were selected for critical analysis. Hence, a fully visible gain in the 4C model development allows concluding that the resulting learning strategies were highly effective as didactic instrumentation. Practical implications are the didactic scenarios that could be used in foreign language teaching with the objective of both subject knowledge and universal competencies included in the 4C model.

Keywords: 4C model; communication; critical thinking; collaboration; creativity; corporate learning.

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1 Introduction

World trends, primarily economic and technological ones, show that nothing in the world is stable and that the main key to success is to recognise this fact. If it becomes difficult to control life's processes, managing one's reactions as a response to change is a realistic task.

The model in the concept of Soviet education was the concept of an escalator, that the choice of a profession was a key factor in career success, although the concept of choosing, standing on a step, and quietly riding up stopped working 20 years ago. The new economic system came, and all the escalators went down. And to avoid falling, a modern specialist must vigorously run; this is called lifelong learning in the modern lexicon.

Hence, the modern intellectual labour market is becoming more competitive, meaning that its participants need to constantly maintain their professional level of knowledge, skills and abilities at a high level. Besides general professional knowledge, a qualified specialist must have a certain list of competencies that guarantee successful and stable career growth and social well-being regardless of their professional field. Creativity, communication, collaboration and critical thinking belong to the category of soft skills, which in the period of the Fourth Industrial Revolution are more important for success than hard skills.

When describing the state of the modern world, specialists from various fields more often use the term VUCA, an acronym for the word's volatility, uncertainty, complexity and ambiguity, indicating that there are almost no stable guidelines and rules in pattern-based forms.

> "Life today is … more complicated … than it was 50 years ago … Global warming, immigration reform, pandemic diseases, and financial meltdowns … today's students must be prepared to solve these challenges. In addition, workforce skills and demands have changed dramatically in the last 20 years … There has been a rapid increase in jobs involving non-routine, analytic, and interactive communication skills. Today's job market requires critical thinking and the ability to interact with people from many linguistic and cultural backgrounds." [Partnership for 21st Century Skills, (2009), p.15]

The COVID-19 pandemic is proof that the modern world can be very unstable, affecting not only the sphere of business as the most vulnerable sector when there are economic changes, but also affecting the rest of life, including education. For this reason, any chaos requires flexibility in the system in which it exists, and in this context, flexibility means a willingness and readiness to change.

Driven by the challenges described above, the higher education system designed to provide society with qualified specialists applies the 4C-based learning model (4C model), which proposes key competencies for 21st century learners (National Research Council, 2011). The competencies included in the 4C model need to be shaped and developed even at the secondary school level.

To adequately prepare students to become better employees and consumers and better citizens of the 21st century, the 4C skills need to be integrated into classrooms through teaching activities that equip students with skills to identify problems, think through solutions and alternatives and explore new options. The study considers possible scenarios of the 4C model integration in teaching a foreign language. The research objective is to develop and describe teaching strategies that could integrate the 4C model

into a language teaching-learning process, emphasising enhancing and promoting these life skills of high school students.

The method of cooperative learning based on learners' interaction expressed through such a learning approach was the main teaching method, with activities such as teamwork, games and a case-study. The research question is: how can an education organisation maximise the 4C model and improve the quality of language teaching and learning?

2 Literature review

The 4C model came to contemporary pedagogy from basic marketing theory, where it was first introduced as the 4P model, based on four basic parameters of marketing planning. In his book: *Basic Marketing: A Global Managerial Approach*, McCarthy (1987) described the 4P model as a company's marketing mix – product, price, promotion and place. Then, Lauterborn (1990) introduced the 4C model, having declared the traditional 4Ps to be obsolete. The idea of the new model was to shift the focus from producer and product to consumers and their needs. In line with the findings of this study, David and John (2009) found the 4C model as key components of marketing communication that were represented in four factors: clarity, credibility, consistency and competitiveness. The same year, pedagogy took the 4C model as a new learning paradigm or the framework for 21st century skills: critical thinking, communication, collaboration and creativity. The Partnership for 21st Century Skills (2009) introduced the concept of the 4C model as an attempt to improve education outcomes to ensure that students are ready for a career. The model included unique skills that can help graduates be flexible in a working environment and easily transfer from one job to another.

Based on current research on educational effectiveness, most Kazakh educational institutions prepared common standards to provide students with academic knowledge and skills needed in the future (Kulgildinova et al., 2018; Yelubayeva and Mustafina, 2020). These standards are called the State Compulsory Education Standards at All Levels of Education of the Republic of Kazakhstan (2018) and State Program on the Development and Functioning of Languages in the Republic of Kazakhstan (2021), emphasising that the 4C model needs to be fully integrated into learning and teaching to prepare citizens and employees adequately for 21st century needs. The document states that besides subject knowledge and professional skills, learners need to possess the competencies of creativity, critical thinking, good communication and the ability to collaborate in professional situations. Integrating these skills into the curriculum generates changes in teaching and learning materials, new methods of teaching and new assessment strategies.

Though not a model, 4C education was first proposed by the US Ministry of Education, Apple, Microsoft and 20 other institutions and education experts in the late 1990s. The concept gained interest among education experts in Japan, including Patrick Newell of the Tokyo International School. The goal of this educational policy is to produce proactive employees who can work individually and within groups. The main components of the 4C education model are the following:

- communication – ability to communicate with people from various backgrounds
- collaboration – ability to collaborate and work with others

- critical thinking – ability to come up with one's answers rather than relying on others' answers
- creativity – ability to use imagination and be creative.

The British Columbia Ministry of Education (2013) in the Cross-Curricular Competencies Agenda defines information and digital literacy as one of the most-demanded skills of the age in communication. Digital tools and resources represent a new realm of communications interaction in which the ability to navigate successfully is essential for success in the 21st century. The issue is not just learning to use new communication tools but mastering many forms of rhetoric, which is a more challenging task.

Many educators consider collaboration as a new skill for working together to demonstrate empathy with others, and collective intelligence enables team members to collaborate digitally and contribute to the joint knowledge-base, whether working remotely or in a shared physical space.

According to some educators, creativity includes leadership for action. In schools, creativity provides students with the experience of situations with no known answer but multiple solutions and where the tension of ambiguity is appreciated as fertile ground (Ackerman and Perkins, 1989; Johnson and Johnson, 2018; Dwi and Dwiyono, 2020; Hebern and Corippo, 2020; Gagliano, 2021). In addition, critical thinking trains students to discover the truth of statements, especially when it comes to separating fact from opinion.

For Vygotsky (2012), Kagan (1994), Swain (2001), Eison (2010), Johnson et al. (2014), Johnson and Johnson (2018), Savignon (2017) and Yelubayeva and Mustafina (2020), most educators favour active teaching tools as the most effective for developing the 4Cs, and one of the most popular is the cooperative learning method.

Nunan (1989) defined communicative learning as a classroom activity that engages learners to comprehend, manipulate, produce or interact with the target language while focusing on meaning rather than linguistic structure. Swain (2001) extended Nunan's (1989) definition, suggesting that focus on the form should be equal to focus on meaning. The author claims while students focus on form, they must be engaged in the act of *meaning-making*, which in its turn relates to the academic content under study. According to Swain (2001), collaboration-based learning enables learners to:

1 improve their communication competence while expressing their position (point of view)

2 externalise social skills by reflecting, revising, assessing and applying them in practice according to practical goals and real-life needs.

Moreover, Swain (2001) argued that collaboration not only stimulates an output that can focus on formulating and testing ideas but also provides opportunities to function as a metalinguistic tool to support academic-specific language development. In addition, collaboration generates unintended consequences as students treat the given task according to their own needs and goals.

Eison (2010) considered active learning strategies as effective tools to involve students in thinking critically or creatively, communicating with team members in both small and big groups, generating ideas both in spoken and written form, exploring attitudes and personality values, and giving and receiving feedback and reflection on the

learning process. He also claimed that students studying cooperatively demonstrate significantly better academic achievement.

According to Kagan (1994), the cooperative learning method teaches students to show empathy, build social relationships and create a mutual understanding in communication. It also enhances students' self-esteem, social skills and study skills. The author defined cooperative learning as a type of structured peer interaction emphasising positive human relationships and collaboration between peers; it is a teaching arrangement with small, diverse groups of students working together to achieve a common goal. Students work together to learn and are responsible for their teammates and learning.

> "Cooperative learning not only makes a student like a school, class, and lesson plans, but the teacher also teaches them to be more responsible, creating a sense in them that they make a difference. Moreover, by working in groups, students increase their higher-level thinking skills and learn to work with others who differ from themselves." [Kagan, (1994), p.127]

Johnson et al. (2014) outlined cooperative learning as students working together in small groups to achieve a shared goal to maximise their and each other's knowledge. According to the authors, collaborative learning has become a significant component of progressive education and an essential feature of effective teaching and learning. It also forms a fundamental basis for other forms of active learning, such as problem-based, team-based and peer-assisted learning (Johnson et al., 2014).

Yelubayeva and Mustafina (2020) asserted that learning strategies enabling students to collaborate have great educational potential since they guide students to acquire additional knowledge and promote the development of communicative skills (planning, information retrieval, decision-making, systematisation, group communication, discussions, cooperation, presentation of results, evaluation, etc.).

So, this case-study presents *cooperative learning as the teaching strategy and effective tool to develop the 4C model in language classrooms*. And to answer the question of why the 4C model is needed for a professional career, it is important to note the following: *communication* is an obvious skill, the basic one to establish personal and business rapport; *collaboration* prepares learners for the workplace and daily interactions, learning how to work with others; *creativity* is about connecting ideas in new ways; and *critical thinking* is needed as an instrument to explore and interact with problems and open-ended activities.

All the above allows the following conclusion:

1 the 4C model is a very popular phenomenon under study in a large number of pedagogical studies

2 most authors consider the 4C model as an effective tool in higher education because this level is 'the last step' to the world of work, and these four important competencies are in high demand in the intellectual labour market

3 a lower number of studies have examined the 4C-model application in schools.

3 Methodology

3.1 Settings and participants

The research is oriented to the 4C model and the teaching strategies that can be used to implement this model successfully and with high efficacy. The target group is 10th-grade learners studying the Kazakh language in public high school #146 (Almaty City, Kazakhstan). The total number of learners was 63, divided into control and experimental groups, with 32 and 31 participants, respectively. The experimental group studied a course based on the 4C model, including teaching strategies developed along the principles of cooperative learning, whereas the control group received traditional language teaching based on embedded context and textbook exercises.

3.2 Data collection

Students in both groups took the online Kazakh language placement test administered as a pre-test to identify their initial language level. The results of the test are presented in Table 1. As can be seen, the average score in both groups is similar, which speaks of homogeneous ground and comparability of the data. According to International Language Standards (CEFR), the language proficiency of the learners corresponds to level B2. At this level, learners can understand the main ideas of a complex text related to their field of study, clearly and spontaneously communicate without strain, produce a detailed text on a wide range of subjects, and introduce their view on a topical issue, giving the pros and cons of various options.

To start developing learning activities targeted at the 4C model integration into the language classroom, the 4C descriptors were identified as:

1 definition

2 application, i.e., activities where each competence could be implemented (Table 2).

Table 1 Pre-experimental test results

Pre-experiment language test results					
Participants	*Reading (max. 100)*	*Listening (max. 100)*	*Writing (max. 100)*	*Speaking (max. 100)*	*Total*
Control group (average points)	76	75	72	75	75
Experimental group (average points)	74	75	70	75	73

The following didactic principles were applied:

- involvement in peer communication, e.g., group-work activities
- task should be problem-based with more than one possible solution
- integration of self-study and teamwork.

Lessons were organised so that learners could:

1 work together to maximise each other's potential and resources

2 compete with each other in achieving a learning goal

3 work individually and in collaboration.

To measure the initial level of the 4C model, case-study tasks were used in which learners read a pre-defined dataset, scenario or application. The case-study task was accompanied by a list of questions that asked learners to reflect on the information and formulate a response to it. As an outcome to be examined, the learners were asked to write (in groups) a report on the topic they discussed where there would be two possible solutions and the argumentation for these solutions.

Table 2 4C descriptors: definition and application

Competence	*Definition*	*Application*
Creativity	Ability to think in a non-standard way.	Generate and brainstorm ideas.
		Evaluate and select ideas, among other things offered by others.
		Create a new product.
		Offer solutions in non-standard situations.
Collaboration	Ability to work together to achieve a common goal; collaborate with people from diverse backgrounds and differing cultures.	Listen to others' arguments.
		Organise work effectively in collaboration.
		Assert, cooperate, compromise, compete, or defer to resolve conflicts.
Communication	Ability to develop and present ideas logically and effectively to enhance communication and collaboration with diverse individuals and groups.	Analyse information.
		Communicate using the speech norms for the discourse and medium chosen.
		Understand the abilities and limitations of technological communication and use them effectively.
Critical thinking	Ability to choose optimal decisions, use inductive and deductive reasoning appropriate to the situation, analyse a complex object (process), understand how its parts interact and influence the environment.	Break something into its parts, examine each part, and note how they fit together.
		Argue through a series of statements connected logically together, backed by evidence, to conclude.
		Identify the categories of something, showing how each category is distinct from the others.
		Point out the similarities and differences between two or more subjects.
		Decide on the worth of something by comparing it against the accepted standards.
		Analyse the causes and effects of a problem and find a way out enabling to solve a problem.

As experimental study tasks, project-based activities were used, examples of which are presented below. The time for each project was strictly limited and counted for six hours of class time (discussions and planning) and ten hours of self-study (analysis, research and presentation).

Example 1: In small groups, create a plan for developing technology-based solutions that can be implemented in the school to optimise the educational process. Start with opinion collection through polls and interviews with teachers, parents and schoolchildren; carry out the need analysis and discuss it with other team members; and calculate the budget of the project and present the project outcomes to a school advisory committee (school board) and the principal.

Example 2: In small groups, identify via interviewing and social network analysis the favourite forms of recreation among local teens. Research the local history of recreational youth facilities for teens and the potential sources of any support (municipal, governmental). Study the current situation and offer potential solutions to improve the situation. Present the findings in graphs (statistics) and create a business plan. Be ready to present project outcomes where the end-user product will be a (business) plan or design a project to send to the city administration.

3.3 Data analysis

The data collected needed to be analysed. Analysis was carried out on the ability to:

1 communicate: lead discussions with group members, present information and answer questions

2 collaborate: demonstrate awareness of audience identity, knowledge and context

3 creativity: come up with some innovative opinions and solutions

4 critical thinking: carry out analysis based on the subject discipline.

As a tool to measure the level of these four competencies and express their level in the figure scale, the rubric with descriptors and scores from 0 to 4 was used, as shown in Table 3.

The experimental study finished with the post-experimental project-based tasks done by both groups. The samples focused on each competence are presented below:

- Communication: The activity is called sandwich, where learners read and annotate a short passage with contrasting viewpoints. Then they individually take notes about ideas they have learned from the passage and compare and contrast the two topics based on the information gathered. They analyse and discuss similarities and differences, focusing on common points. The final stage is summarising and presenting the findings to other teams where they engage in meaningful conversation, learning social cues and listening skills.
- Collaboration: The activity is called *Iron Chef* (a prototype of the Japanese cooking show). This activity scaffolds the skills for working with others. Learners are given a text which is split into four sections. Each learner reads their part and creates a slide that paraphrases, summarises and explains the text. Learners add a graphic and a 'secret ingredient'. Then, each group shares it with others.
- Creativity: The activity is called *Random Emoji Power Paragraph*, a game that gives learners the freedom to create their own story. The learners write one sentence per emoji. Each emoji is revealed one at a time. The ideas are connected as each subsequent emoji appears. Then, the learners write their sentences to show and share

paragraphs back to the class. The activity finishes with editing and revising each other's paragraphs (other teams).

- Critical thinking: The activity is called BookSnaps, where learners read their books. Then, they prepare a four-slide and one-minute presentation with a critical view of the topic.

Table 3 Rubric for project tasks

Skill	*Excellent (4)*	*Good (3)*	*Fair (2)*	*Poor (1)*
Collaboration	Demonstrate high awareness of the audience's identity.	Demonstrate understanding of the audience's identity.	Demonstrate some attention to the audience's identity.	Demonstrate minimal attention to the audience's identity.
Communication	Present ideas articulately and persuasively in a discussion. Use sophisticated arguing strategies.	Keep up with the discussion and can justify an opinion. Respond and interact adequately with other speakers. Use communication strategies.	Some difficulty is keeping up with the discussion and arguing an opinion. Limited use of communication strategies.	Marked difficulty in keeping up with the discussion and contributing only occasionally.
Creativity	Demonstrate ability to come up with some innovative opinions and solutions.	Attempt to search for a few innovative opinions and solutions.	Attempt to search for any innovative opinion and solution.	Fail to demonstrate or does not attempt to give any innovative opinions and solutions.
Critical thinking	Deep and critical analysis based on a wide range of interdisciplinary perspectives.	Satisfactory analysis based on the subject discipline at a decent level.	Analysis based on the subject discipline at a surface level.	Fail to analyse the case with the context of the subject.

4 Results and discussion

Keeping in mind the research specificity, teaching a foreign language, the value that defines the language level was chosen as a significant variable considered while analysing the experiment results. As the focus of the study, four key competencies were selected and included in the competencies profile of a modern specialist and are the basis of the 4C model as the current and relevant school education model in the Republic of Kazakhstan. To determine the language level, a standardised test with all speech activities was used. The results of the test for both groups are shown in Table 4.

As seen from Table 4, the average figure value for both groups increased by 7%–10%, which corresponds to the teaching prediction – the ratio of the knowledge gained about the study hours prescribed by the program. The second value, given in parentheses, displays the increase in knowledge gained by groups. The value in most cases is twice as high in the experimental group compared to the control one. This

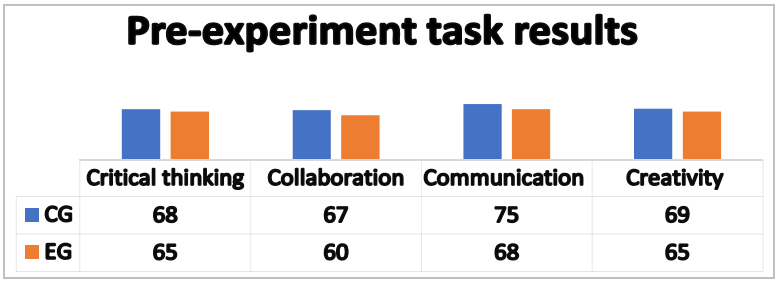
increase is explained by the active participation of learners in class activities, their interest and involvement, which may indicate a high level of motivation, the key indicator of success in learning any foreign language.

Table 4 Post-experiment language proficiency test results in control and experimental groups

Post-experiment language test results					
Participants	*Reading (max. 100)*	*Listening (max. 100)*	*Writing (max. 100)*	*Speaking (max. 100)*	*Total*
Control group (average points)	82 (+6)	80 (+5)	77 (+5)	80 (+5)	80 (+5)
Experimental group (average points)	85 (+9)	86 (+11)	82 (+12)	90 (+15)	86 (+13)

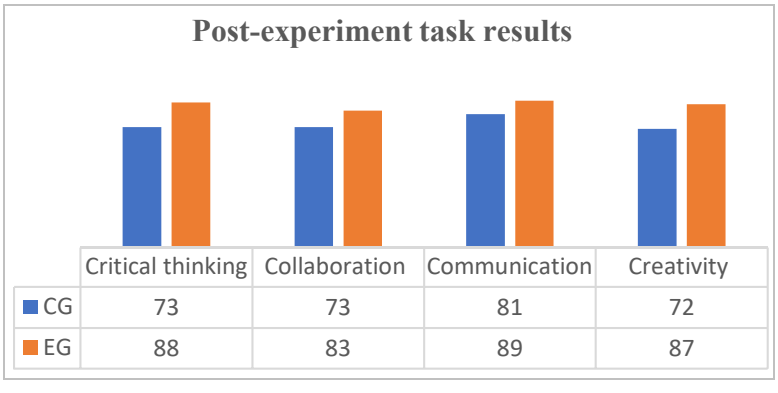
The description of the methodology of the experimental teaching presents an example of the task used to determine 4C development among learners in both groups. The assessment was based on the score from 1 to 4, included in the rubric presented above. The figure-based values allowed a calculation of a quantitative index (average index), which is introduced in Figure 1 as a percentage.

Figure 1 Pre-experiment results in CG and EG (see online version for colours)



At the end of the experiment, the groups were presented with the final project task. Assessment of the 4C development level was carried out with the same algorithm as the pre-experimental testing. The results are shown in Figure 2.

Figure 2 Post-experiment results in CG and EG (see online version for colours)



Task accomplishment results suggested that students from treatment groups encounter fewer problems than students from control groups. There were slight improvements in students' academic performance from the control groups. They still have problems with social interactions and soft skills like problem-solving, creativity and linguistic issues. The results of students from treatment groups are quite optimistic. Their post-experiment task performance indicated that the ability to make appropriate critical decisions (critical thinking) increased from 65 to 88, which is +23 as progress gain. The ability to work together (collaboration) to achieve a common goal or to solve a problem increased from 60 to 83 (+23). The ability to generate, transmit, explain and negotiate information (communication) increased from 68 to 89, which is +21 as progress gain. The ability to think unconventionally to create new products and solutions to problems (creativity) increased from 65 to 87 (+22).

The statistical significance of the obtained indicators from the students' tests was determined. This criterion was used to determine the statistical significance of differences in the mean values in two or more independent samples. The obtained value of the student's t-test must be interpreted correctly. For this purpose, the number of degrees of freedom was found according to the formula $f = (n^1 + n^2) - 2$, where n^1 is the number of respondents in CG and n^2 is the number of respondents in EG. After that, the critical value of the student's t-test was determined for the required level of significance (for example, $p = 0.05$). The calculation is shown in Table 5.

Table 5 T-test calculation

#	*Sample*		*Deviation from average*		*Squared deviation*	
	CG	*EG*	*CG*	*EG*	*CG*	*EG*
1	73	88	–1.75	1.25	3.0625	1.5625
2	73	83	–1.75	–3.75	3.0625	14.0625
3	81	89	6.25	2.25	39.0625	5.0625
4	72	87	–2.75	0.25	7.5625	0.0625
Total	299	347	0	0	52.75	20.75
Average	74.75	86.76				

Results: t-test = 4.9. The obtained value of the student's t-test, 4.9, was compared with the critical at $p = 0.05$ value, indicated in Table 5: 1.993. Since the calculated value of the criterion was greater than the critical value, it was concluded that the observed differences were statistically significant (significance level $p < 0.05$). The obtained empirical value of t (4.9) was in the zone of significance.

From teachers' observations, learners were able to demonstrate the ability to:

1 generate and communicate ideas to make a significant contribution to teamwork

2 evaluate their contribution to the overall results

3 appreciate cooperation in group work when solving practical problems

4 improve their tolerance to differences in others' cognitive ability

5 seek to think critically and creatively.

Based on the facts and figures cited above, it was concluded that the teaching strategies proposed were effective in integrating and applying the curriculum material to meet the

learning objectives: to develop the 4Cs through teaching a foreign language. In addition, suggested teaching strategies enable facilitators to effectively assimilate and apply curriculum material to meet the learning objectives. Proposed tasks are consistent, overlap and complement each other. They all lie in one space that supports students' cognitive development and fill it with real-life content. However, they are still innovative for most Kazakh schools.

5 Conclusions

The paper describes the research conducted at a secondary school in the Republic of Kazakhstan with a focus on the 4C model implementation in language classrooms. The research aimed to identify teaching strategies maximising the 4Cs among school pupils when learning a foreign language.

The study revealed that the 4C model can be very effective in preparing high school pupils for the changes and challenges of modern times through practice in mastering the necessary skills to be successful in their future professional careers and personal development. The market requirements analysis and overview on school curricular content showed the gap in expected outcomes, in particular, market requirements for specialists to have a certain number of soft skills to be ready for the world of VUCA.

The research hypothesis stated that the quality of learning and the level of general training within school education would be improved if learner-centred active learning methods such as cooperative learning were used in the learning process, where the focus would be on collaboration, communication, and critical and creative thinking. The experimental study involved teaching strategies optimal for the 4C model, proving their efficacy. Namely, the suggested teaching strategies enabled learners to:

- comfortably and confidently communicate ideas, give critical and creative input in collaborations with other classmates
- interact with each other to acquire and practice learning materials to meet common learning goals.

These findings suggest that mastering the 21st century competencies (critical thinking, creativity, communication and cooperation) based on cooperative learning in the school education framework will help students navigate the ever-changing world and large flows of information and provide them with the ability to learn throughout their life.

The present study has highlighted the premise that integrating basic language skills and 4C skills is a powerful approach to help learners make form-meaning connections and measurable gains in language learning outcomes. The findings of this present study may contribute to learners, teachers and syllabus designers. Suggested didactic scenarios to design activities involve collaboration and critical thinking to prepare the pupils for the unique demands of a 21st century world. The 4C-based learning through the appropriate activities planned by the teacher would be more enjoyable for learners because it moves away from tedious.

Thus, the analysis and practice in the 4C model application showed the potential of this pedagogy to improve the quality of education and knowledge level as the main education outcome. The strategies proposed by the author are the only first steps for the

sustainable development of both the national education system and the national labour market.

As research methodology covers an extensive range of methods and techniques, we understand that this overview was limited in scope and examples. First, the scope of this study was mainly geared toward exploring the teaching strategies as cooperative learning for implementing the 'four Cs skills' in the language classroom. Future research might explore what other learning strategies (ex., game-based learning, personalised learning, self-learning or project-based learning) and digital tools might have similar developmental patterns in terms of communication skills through the four Cs. Second, the study was limited by the number of participants (high school language learners) and materials. Future studies might assess an increased number of participants (including young learners) and materials to understand better the effectiveness of bridging the gap between basic language skills and 4C skills required by the Fourth Industrial Revolution.

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