FACTORS FORMING COLLABORATION WITHIN THE KNOWLEDGE TRIANGLE OF EDUCATION, RESEARCH AND INNOVATION

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ABSTRACT: A proper combination of education, research and innovation is provided by varied cooperative networks. However, the success of collaboration within a multicultural environment requires that the key factors enabling synergy between education, research and innovation have to be considered. Aim of the following paper is to identify and to analyze these key factors within the knowledge triangle of education, research and innovation. The meaning of the key concepts of education, research and innovation is studied within the search for factors forming collaboration. The results of the paper reveal the factors forming successful collaboration to become more mobile, to learn from the experiences of others and to work in a qualitative way.

1. INTRODUCTION

The knowledge triangle of education, research and innovation contributes new and better jobs in new industries and offers potential solutions for the quality, maintenance and sustainable development of public services, social-security and health-care systems, and as a basis for prosperity and economic development in the European Union. Synergies between education, research and innovation are created through active collaboration [1, p. 4]. Aim of the paper is to identify and to analyze factors forming collaboration within the knowledge triangle on the pedagogical discourse. The search for factors forming collaboration within the knowledge triangle involves a process of analyzing the meaning of key concepts, namely, knowledge triangle, collaboration and factors forming collaboration. The study would show a potential model for development indicating how the steps of the process are related following a logical chain: defining knowledge triangle collaboration within the knowledge triangle → factor definition → factors forming collaboration.

The remaining part of this paper is organized as follows: Section 2 introduces the components of the knowledge triangle. Collaboration within the knowledge triangle is studied in section 3. Factors forming collaboration will be analysed in section 4 and 5. The associated results are presented and interpreted in section 6. Section 7 provides some concluding remarks. Finally, a short outlook on interesting topics for further work is given in section 8.

2. DEFINING COMPONENTS OF THE KNOWLEDGE TRIANGLE

The components of the knowledge triangle are determined as education, research and innovation [1, p. 2].

- Education provides the appropriate skills and competences for innovation and creates new knowledge within the knowledge triangle of education, research and innovation.
- Research supported by data sharing is to identify, to define, to measure and record learning outcomes [1, p. 3].
- Innovation is defined as the process and the outcomes of this process through which new ideas respond to societal or economic demand and generate new products, services, or business models that are successfully introduced in an existing market or that are able to create new markets [1, p. 14].

Thus, the relations and synergies between education, research and innovation are the main drivers of the global knowledge economy [1, p. 2].

3. DEFINING COLLABORATION WITHIN THE KNOWLEDGE TRIANGLE

Collaboration is seen as a strategy to put the components of the knowledge triangle, namely, education, research and innovation, into mutual interaction contributing to societal well-being through increasing understanding and promoting economic growth as well as improving societal cohesion. However, collaboration is formed by factors.

4. DEFINING FACTORS

Factor is defined as a reason of the research subject change [2, p. 7]. They are considered to be as external and internal [3, p. 36, 40].

- External factors in pedagogy are determined as surroundings and resources.
- Internal factors in pedagogy are seen as the aims of the student's activity, motivation, interest and skills, experience.

Thus, factors form collaboration to enable synergy between education, research and innovation.

5. FACTORS FORMING COLLABORATION

The analysis of external and internal factors in pedagogy as well as the definition of collaboration within the knowledge triangle allows considering the following factors on the pedagogical discourse:

- factors forming communication,
- teacher's purposeful activity as an external factor [4, p. 31] and
- learning factors.

5.1. Factors Forming Communication

Factors forming communication are determined by K. Shumin as follows [5, p. 8]:

- aural medium,
- socio-cultural factors and
- non-verbal communication system.

5.1.1. Aural Medium

During interaction, every speaker plays a double role – both as a listener and a speaker. Speaking feeds on listening which precedes it [5, p. 9]: one person speaks, and the other responds through attending by means of the listening process. The main potential problems of listening comprehension are determined as follows [6, p. 11-21]:

- hearing the sounds,
- understanding intonation and stress,
- coping with redundancy and "noise",
- predicting,
- fatigue,
- understanding different accents and
- using visual and aural environmental clues.

5.1.2. Socio-cultural Factors

Socio-cultural characteristics, namely, social-economical status, religion, language, address (urban, country, more or less prestigious area), interests, abilities and talents, also form communication where the shift has changed from focusing on macro-cultures to micro-cultures (family culture, school culture, class culture, professional culture, gender culture, culture of interest groups, political groups/parties, generation) [7, p. 102-103]. Also, each language has its own rules of usage as to when, how, and to what degree a communicator may impose a given verbal behaviour on his/her conversational partner where due to influence or interference of their own cultural norms, it is hard for non-native speakers to choose the forms appropriate to certain situations [5, p. 9]. Thus, all groups/classes are understood to be multicultural. It has led to a new perspective: people behave being influenced by identification with different groups, not only one group [7, p. 102-103].

5.1.3. Non-verbal Communication System

Moreover, communication involves a very powerful non-verbal communication system (gestures such as the language of gazes, the language of poses and bodily movements; interaction through the use of their bodies, faces, hands, legs, eyes, mimicry, intonation, space management, dress code, gift giving) adding meaning to verbal judgments, which sometimes contradicts the messages provided through the verbal listening channel. A lack of familiarity with the non-verbal communication system of the target language often leads to misunderstanding [5, p. 9].

Out of all types of non-verbal components of communication it is significant to concentrate on the description of several aspects of mimics and gazes that constitutes a separate language, the so called "kinesic gaze".

- Mimicry is often considered to be the most universal way of communication. The representatives of different cultures express six main human feelings – fear, disgust, fury, astonishment and happiness – in a similar way.
- Facial expression is a "mask", a mask that at the same time reflects the emotional state and certain cultural predispositions or customs of an individual. It is common knowledge that in order to function in society successfully one has "to put up a proper face" to show proper attitude towards particular situations, to observe etiquette.
- Another important element in the process of non-verbal communication is the glance. The importance of eye contact in the process of communication differs so greatly from culture to culture, that it is customary to distinguish between contact and non-contact cultures. Contact cultures, namely, Spanish, Italian, Arabic, Latin American and some others, expect participants of non-verbal communication to follow the expression of the eye contact and the face of another person in order to receive additional information. A person with an open face and a straightforward look is considered to be frank, honest and dependable. On the contrary, someone who tries to avoid eye contact or make the observation of his face difficult is often defined in negative tones. For non-contact cultures (the Scandinavian countries, India, Pakistan, Japan, etc) it is more natural to avoid eye contact with another person.

Cultural and regional differences often influence non-verbal aspects of human communication and therefore they should constitute part of its analysis: Latvia is a "middle contact" type of culture. Latvians would make eye contact with the person they interact with, but this look would not be long or expressive. Latvians employ the smile to express feelings of pleasure or approval. They do not view it as part of formal etiquette or a tool for hiding reality. However, since the history of their country seldom left them pleased or satisfied, they do not smile often. For a Latvian it is difficult to understand American "smile" way of life as it is for Americans to see the importance of seriousness of Latvian national character. One has to conclude that Latvians smile, glance and gesticulate in their own distinct way. This way is not better or worse than that used by the other cultures, it is just different, and should be accepted as such. However, those specific kinesic features can and very often do create difficulties in the process of communication between Latvians and representatives of different cultures who are typically unaware of those features and their true meaning. At the same time, non-verbal communication skills exhibited by the young generation of Latvians are virtually free from the clichés. They easily adopt west European standard of communication.

5.2. Teacher Activity

In order to organise teaching activity, teacher needs to take into consideration several areas [8, p. 75]:

- careful preparation of material including specifically chosen lexical areas and seeking repetition of information,
- careful clarification of the task before undertaking it,
- planning whether the activity should fit into the general progression of the syllabus or whether it should be an independent activity aimed at satisfying the study purpose of certain individual learners,
- finding out whether it fits in with other and parallel teaching situations,
- negotiating a balance between task needs and individual or group needs,
- planning how varied the types of activities should be,
- competition as a stimulus and not as a hostile activity,
- scoring the activity results to help the learners to be aware of their progress and
- ensuring sensitivity to any emotional or cultural blockages which might interfere with the learners' confidence to use the knowledge in relation to the particular topic, situation or functional purpose.

Thus, the teacher is identified in a number of roles that relate to the process of organizing teaching activity [9, p. 26]:

- assessor,
- corrector,
- organizer in giving instructions for the pair work, initiating it, monitoring it, and organizing feedback,
- prompter while students are working together and
- resource if students need help.

Correction is made up of two distinct stages [10, p. 106]:

- teachers show students that a mistake has been made and
- teachers help the students to do something about it.

There are a number of different ways how to show incorrectness [10, p. 106-107].

- Repeating: here we can ask the students to repeat what they have said.
- Echoing: we repeat what the student has said emphasising the part of the utterance that was wrong.
- Statement and question: we indicate that something has not quite worked saying *That is not quite right*, or *Do people think that is correct?*
- Expression: when we know our classes well, a simple facial expression or a gesture (for example, a wobbling hand), may be enough to indicate that something does not quite work. This needs to be done with care as the wrong expression or gesture can, in some circumstances, appear to be mocking or cruel.
- Hinting: a quick way of helping students to activate rules they already know (but which they are temporarily "disobeyed") is to give a quiet hint: for example, we might just say the word "tense" to make them think that perhaps they should have used the past simple rather than the present perfect or "countable" to make them think about a concord mistake they have made. This kind of hinting depends upon the students and the teacher sharing metalanguage (linguistic terms) which, when whispered to students, will help them correct themselves.
- Reformulation: an underrated correction technique is for the teacher to repeat what the student has said correctly, reformulating the sentence, but without making a big issue of it.
- Recording mistakes: most teachers write down points they want to refer to later; teachers can also record students' performance on audio or videotape. Another alternative is to divide students into groups and have each group watch for something different – for example, one group focuses on pronunciation, one group listens for the use of appropriate or inappropriate phrases, etc. Another possibility is for the teacher to transcribe parts of the recording for future study.
- After the event: teachers might want to give an assessment of an activity, saying how well the teacher thought the students did in it, getting the students to tell us what they found easiest or most difficult. Teachers can put some of the mistakes they have recorded on the board and ask students firstly if they can recognise the problem, and then whether they can put it right. Another possibility is for teachers to write individual notes to students, recording mistakes they heard from those particular students with suggestions about where they might look for information about the language – in dictionaries, grammar books, or on the Internet.

In case students do not know or understand what the problem is because it is dealt with an error or an attempt that is beyond the students' knowledge or capability the teacher will want to help the students get it right [10, p. 106-107].

- If the student is not able to correct him/herself, or respond to reformulation, we need to focus on the correct version in more detail. The correct version emphasizes the part where the problem is (e.g. Flight 309 GOES to Paris) before saying the sentence normally (e.g. Flight 309 goes to Paris), or we can say the incorrect part correctly (e.g. Not "go". Listen, "goes"). If necessary we can explain the grammar or a lexical issue. We will then ask the student to repeat the utterance correctly.
- We sometimes ask students to correct each other. We might hope that other students know the correct version of the utterance – after which the student who made the mistake should be able to say the sentence, question, or phrase accurately.

Student-to-student correction works well in classes where there is a genuinely cooperative atmosphere; the idea of the group helping all of its members is a powerful concept [10, p. 107]. Nevertheless it can go wrong where the error-making individual feels belittled by the process, thinking that she/he is the only one who does not know grammar or vocabulary: there is a need to be exceptionally sensitive here, only encouraging the technique where it does not undermine such students.

S. Thornbory concludes that a practice activity which is good for knowledge improving will have these characteristics [11, p. 92]:

- Attention to form: the practice activity should motivate learners to want to be accurate, and they should not be so confused on what they are saying that they have no left-over attention to allocate to how they are saying it.

- Familiarity: learners need to be familiar with the subject that they are trying to get right.
- Thinking time: monitoring for accuracy is easier and therefore more successful if there is sufficient time available to think and reflect.
- Feedback: learners need unambiguous messages as to how accurate they are – this traditionally takes the form of correction.

Teachers need to respond to the content not just the language form; teachers need to be able to untangle problems which students have encountered or are encountering [10, p. 107].

Discussing the role of teacher as resource it is important to remember that students are also resources [12, p. 5]. In order to have sufficient subject-specific knowledge, Popova [13, p. 14-15] suggests to keep in touch with other students' subject teachers. She claims that it is a time-consuming task but it pays. It gives you information about:

- what they have already studied,
- what they are studying now,
- what sources they need to consult for subject-specific information and
- what the subject teacher can help you with in terms of diagram reading, equivalents of terms, specific skills that students need to develop in relation to their job prospects.

If the teacher has all this information, s/he can [13, p. 14-15]

- draw on students' former knowledge and experience,
- teach those aspects that will help them acquire subject-specific information,
- make use of what each student is good at for classroom activities and tasks and
- boost his/her self-confidence by relying on expert information and consultancy.

Another way that can be suggested is to contact other teachers doing the same work. That reveals the necessity to emphasize on more general social and political theories such as democracy, social justice, equality and legitimacy in order to be able to [14, p. 4-5]

- work with information, technology and knowledge,
- work with their fellow human beings – pupils, students, trainees, adult learners, colleagues, and other partners in education and
- work with and in society – at local, regional, national, European and broader global levels.

There is also a discussion on the issue of a European Teacher [15, p. 10] where common European teacher's principles are as follows [14, p. 5]:

- a graduate profession with three cycles,
- a profession placed within the context of lifelong learning,
- a mobile profession and
- a profession based on partnerships.

5.3. Learning Factors

There is a range of learning factors learning achievements depend on [5, p. 8], [16, p. 42]

- age of students,
- affective factors,
- motivation and
- learning experience.

5.3.1. Age

Age is considered as one of the most commonly cited determinant factors of success or failure in learning [5, p. 8]. For example, beginning to learn a foreign language in early childhood through natural exposure gives higher proficiency than those beginning as adults.

5.3.2. Affective Factors

The affective factors related to learning are emotions, self-esteem, empathy, anxiety, attitude and motivation [5, p. 9]. Also, the tendency to be sensitive to perceived views of themselves by others is a worry about personal images of great personal importance for everyone thereby developing extreme anxiety as a variable of emotional responses where seven categories of anxiety are emphasized [1, p. 20-21]:

1. comparison of myself with other students,
2. emotive responses to the comparisons described above,
3. the desire to outdo the other students,
4. emphasis on tests and grades,
5. the desire to gain the teacher's approval,
6. anxiety experiences during the class and
7. withdrawal from the learning experience when the competition was overpowering.

In order to overcome ethnocentricity as an attitudinal variable there is a need to build positive attitudes to the subject study through motivating content and tasks [9, p. 20].

5.3.3. Motivation

Then, a significant aspect in the learning/teaching process is seen as motivation defined as that we have to want to do something to succeed at it [10, p. 51].

Motivation can be

- extrinsic that is caused by a number of outside factors and
- intrinsic motivation that comes from within the individual and is especially important for encouraging [10, p. 52].

Intrinsic motivation consists of six components [17, p. 50]:

- enthusiasm,
- feeling when you can control situation yourself,
- rejoice when you have some achievements,
- own experience in interesting learning process,
- an ability to estimate your achievements and
- any support from environment.

Motivation is ensured by

- earning a living,
- intellectual stimulation,
- a feeling of satisfaction and fulfilment and
- receiving recognition.

There are three areas where teacher can attract students' continuing participation [10, p. 53]:

- goals and goal settings,
- learning environment and
- interesting classes.

A way to motivate students is to focus on creating successful employment prospects for students [9, p. 23-24]. A new outlook emphasizes focusing not on today's problems or contradictions but on student's desires where desire is a subjective component of motivation. Moreover, individuals are especially motivated if they can control their own learning process, set their own goals, take responsibility for their learning, are able to work independently, are able to evaluate their own learning process and continue to improve their skills [16, p. 39].

5.3.4. Learning Experience

Also, drawing upon the experiences of individuals is important; both life-experiences as well as abilities that may be dormant [16, p. 39]. The following description of language acquisition/learning illustrates the role of experience in learning:

Acquisition

- Native Language (L1)
- Second Language (L2)

Learning

- The First Foreign Language (L3)
- The Second Foreign Language (L4)
- The Third Foreign Language (L5).

The model of first language acquiring outlines two dimensions:

- the universal (born condition in order to learn a language)
- and the learning environment that is an investment a child takes life-long (everything that is around the child during his/her life can influence it (people, circumstances, possibilities, etc.)).

The process of second as a foreign language learning already involves three more factors:

- native language experience,
- private life experience and
- learning experience, including motivation.

In accordance with the ideal model of foreign language learning, the next foreign language learning becomes easier [16, p. 43]. But real life reveals problems that appeared in the process of previous language learning and make next foreign language learning difficult: even creating ideal circumstances for foreign language learning teacher cannot be sure about learning ideal results because there is a student who acquire a new language therefore it is more important to pay attention to what the student get from different types of activities in the classroom [16, p. 43].

6. RESULTS

The search for factors forming collaboration within the knowledge triangle involves a process of analyzing the meaning of key concepts, namely, knowledge triangle, collaboration and factors forming collaboration. The study shows a potential model for development indicating how the steps of the process are related following a logical chain: defining knowledge triangle→ collaboration w ithin the knowledge triangle→ factor definition→ factors forming collaboration.

7. CONCLUSION

The identified and analyzed factors allow forming productive collaboration within a multicultural environment that enables synergy between education, research and innovation.

8. OUTLOOK

Further research on factors forming productive collaboration within a multicultural environment that enables synergy between education, innovation and research is considered to include

- criteria, indicators and levels of forming collaboration,
- a relevant set of methods to evaluate each criterion and
- empirical studies.

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