LOOK
ACADEMIC PUBLISHERS

OPEN ACCESS

Interdisciplinary Learning as a Basis for Formation of Intercultural Communicative Competence

Nadezhda N. Redchenko[a]

[a]National Research Nuclear University MEPhI (Moscow Engineering Physics Institute), Moscow, RUSSIA

ABSTRACT

An interdisciplinary approach provides many benefits that warrant the need for its use at technical universities teaching foreign language as an academic discipline. This article reviews recent Russian researches focused on interdisciplinary integration, summarizes advantages and proves overall high efficacy of the interdisciplinary approach to teaching a foreign language for students. When taken as a basis, this approach was found to open up new prospects for implementation of didactic principles of learning at foreign language classes. The article describes the implementation of the principles of interdisciplinary coordination, systematicity and consistency, scientificity, occupational focus, visualization, affordability, strength, consciousness, pro-active behavior, educational training, availability, focus on student's individual character, and intercultural interaction within the framework of the interdisciplinary approach. Incorporation of these principles is demonstrated using training of students of the National Research Nuclear University MEPhI [Moscow Engineering Physics Institute] as an example. At MEPhI, students learn a foreign language during the entire period of their education and study the following credit modules: Introduction into General Technical Foreign Language; General Technical Foreign Language; Occupation-oriented Foreign Language; Foreign Language for Occupation-oriented Communication, Business Communication; Foreign Language for Academic Research; and Communication Foreign Language (in-depth study).

Introduction

The need to raise the level of foreign language communicative competence as an element of professional competence of future technical specialists demonstrates the importance of improvements in the methodological framework of teaching foreign languages. Humanities have recently tended to become more occupation-oriented. This provides favorable conditions to study specifics of application of the interdisciplinary approach in learning a foreign language. It is the approach that can strengthen students' motivation to learn a foreign language (Starodubtseva, 2015).

CORRESPONDENCE Nadezhda N. Redchenko ✉ redchenko@intmail.net

An understanding of a need to implement an interdisciplinary approach has been already recognized by a global community. For example, interdisciplinary approach is now widely discussed at international conferences and workshops around the world. Just to name a few: Interdisciplinary Approach in Teaching and Learning to Promote Learners Creativity and Entrepreneurship Skills (workshop, Latvia, 2014); Interdiscipline and Transdiscipline: Challenges in the XXI Century (conference, Argentina, 2015), 21st International Interdisciplinary Conference on the Environment (USA, 2015) etc. This warrants the need for further research and demonstrates wider practical use of the interdisciplinary approach at higher educational institutions (Habók and Nagy, 2016).

Methodological Framework

The interdisciplinary approach is studied by many contemporary scientists including R.A. Yafizova (2013), E.G. Koposova (2010), V.P. Shibayev (2008), N.A. Bredneva (2009), Y.V. Golubev (2013), A.V. Zelenkova (2014), and A.V. Perekhozheva (2012). A series of interdisciplinary integration studies analyzed a foreign language as an exemplary academic discipline. Among the authors of these studies are A.Y. Sochneva (2011), and N.V. Popova (2011). Although these studies are important and fundamental, further learning of a foreign language as an academic discipline in a technical university based on interdisciplinary approach remains an open issue. In particular, incorporation of didactic principles to this approach should be explained in more detail.

The purpose of this article is to describe the implementation of fundamental didactic principles of learning, such as interdisciplinary coordination, systematicity and consistency, scientificity, occupational focus, visualization, affordability, strength, consciousness, pro-active behavior, educational training, availability, focus on student's individual character, and intercultural interaction in the framework of the interdisciplinary approach.

Results and Discussion

A trend towards more occupation-oriented approach in teaching a foreign language as an academic discipline may be demonstrated by the National Research Nuclear University MEPhI (see Table 1 below).

As shown on Table 1, general technical foreign language is taught from the first year, so students could obtain general means of a foreign language. Moreover, skills listed in educational/qualification programs are also interdisciplinary by nature and are developed as far as a student go through an interrelated cycle of professional and practical training rather than studies individual academic disciplines. As a result, undergraduate students should develop integrative competences to become pro-active members of the modern scientific society (Moloney, 2016; Korhonen and Weil, 2016).

Table 1. Academic disciplines and credit modules

Discipline	Credit module	Year
Foreign language	Introduction into general technical foreign language	1
	General technical foreign language	2
Occupation-oriented foreign language	Occupation-oriented foreign language	3

	Foreign language for occupation-oriented communication. Business communication	4
Occupation-oriented foreign language (in-depth study for master's degree program)	Foreign language for academic research	5
Occupation-oriented foreign language (in-depth study for specialists)	Occupation-oriented foreign language (in-depth study)	5

A matter of interdisciplinary education was widely discussed in the USA in 1980s. Thanks to studies of Hilda Taba (1966) and other researchers, this approach becomes even more relevant as no approach focused on a single discipline could give an insight into an issue and allows a researcher to study it at different angles or to assess and analyze the available findings in an unbiased manner.

In late 1980s, most scientists came to the conclusion that interdisciplinary education could improve mastering of certain disciplines rather than replace them. Since that time, the main challenge for the teaching community was to select such interdisciplinary links that could trigger high-order thinking and reject weak links which could provoke cognitive dissonance. First defined by Festinger in 1956, the term 'cognitive dissonance' means a mental stress experienced by an individual who holds contradictory knowledge and beliefs when existence of one phenomenon denies the other (Fabricius et al., 2016; Habók and Nagy, 2016).

The interdisciplinary approach substantially boosted the development of science at large. Interdisciplinary sciences develop at intersection of different disciplines, e.g. materials science, physical chemistry, ecology, psycholinguistics etc. Furthermore, there is even Interdisciplinary Academy of Sciences, a public organization, focused on, inter alia, promotion of wider use of scientific achievements in learning processes, information exchange with foreign organizations and scientists from different countries etc. (Shahijan et al., 2016). The interdisciplinary approach provides many advantages, including but not limited to:

– motivating students to learn a certain subject, to understand, compare and apply the knowledge they gain in practice;
– an opportunity to present known material in a new way;
– broadening one's outlook, enhancing student's independence and creativity;
– integrating one's knowledge, skills and competences as a whole so students perceive the material they master as seamless whole over the entire course of their study;
– an opportunity to implement the main didactic principles of learning.

Based on the specifics of teaching a foreign language at technical universities, the following factors should also be mentioned (Razlivinskaya, 2015):

– preparation of a new topic strengthens cooperation between teachers of humanities and those of technical subjects, allow them to join their efforts and help to elaborate their topics at various angles to prevent overlapping of the material in learning various subjects;
– interdisciplinary topics and situations allow a foreign language teacher to update the existing teaching program; to use wider range of social roles, language and speaking materials so students could develop communicative competence in foreign language;

- preparation of a lesson based on interdisciplinary approach boosts teacher's creative thinking, allows him/her to develop new interesting exercises and encourages teacher's professional growth.

Among advantages of the interdisciplinary approach is the implementation of didactic principles of teaching. First of all, the interdisciplinary coordination enhances interaction in teaching various subjects, coordinating topics and academic programs. This, in turn, implements the principle of systematicity and consistency in introducing learning materials and developing the required skills and competences (Vetrova et al., 2015).

The principle of scientificity is implemented by incorporating modern scientific knowledge related to the students' program and language studies, specifics of communication, teaching theory etc. For example, for students of the Faculty of Chemical Technologies, this includes chemistry, medicine, physics, pharmacy, biology, merchandising, geology, ecology, astronomy, history, agriculture, technology, as well as psycholinguistics, pedagogics, rhetoric etc. (Lifanova, 2015).

The principle of occupational focus is achieved by using occupation-oriented foreign language materials. With this principle in mind, foreign language classes use topics related to professional and practical training of future chemists, so students could discuss and address scientific, manufacturing, social, economic, environmental issues and simulate situations of their professional activities. All these measures help teachers to take into account professional interests of their students, so they could master their educational program, specifics of communication and, as a consequence, to better master their profession (Uvarova and Yerina, 2015).

In the interdisciplinary approach, the principle of visualization means using charts, photos, models etc. at foreign language classes to demonstrate crosslinks between various academic disciplines. The principle of affordability is implemented by incorporating knowledge, skills, competences gained before and focusing student's attention on an interdisciplinary issue and then on the social context of such issue and, finally, on a demonstrative role play. This will help to avoid unwanted problems when studying material in a foreign language (Glasgow and Paller, 2016; Huang, 2016).

The principle of strength means that interesting materials, drama and humor elements, creative tasks, repeating of educational material in new situations and other methods are used at foreign language lessons. For example, students of the Faculty of Technology may find some interdisciplinary topics very exciting, such as Packing of M & Ms or Trans Fats which show the relationship between chemistry and merchandising; The Human Genome Project and Transmutation which demonstrate links between chemistry and biology; Managing Nuclear Wastes and The Plastics (crosslinks between chemistry and ecology); Green Building and Nanotechnology (chemistry and technology) etc. (Gulow and Fritz, 2015).

We have identified the following universal pathways for development of needs:

1. Change in student's status in his/her life and in the system of relationship in particular. Various social roles require a student to meet various requirements, allow him/her to develop a feeling of emotional wellbeing and trigger new intentions and wishes.
2. Mastering new methods and forms of his/her behavior and activities. As a result of competences, skills and efficient communicative experience

he/she gains, a student develops a sense of self-worth, self-respect and a need in communicative activities, a wish to strengthen and develop his/her positions.

3. Development of the need itself, inside motivation, when development of certain elements of motivation develops the other.

4. Development of the structure of motivational sphere, i.e. development of interaction of needs and motives.

The pathways for development of needs described above should be used in the following manner:

1. To vary the status and position of undergraduate students in an educational setting to create situations which promote their personal growth and successful communicative interaction.

2. To promote learning new methods and forms of communication behavior to strengthen self-respect and satisfaction of MEPhI students with their communication process and their need to strengthen and develop their communicative competences and skills.

3. To develop needs inside student's motivation, as development of motivation elements such as a goal and motives triggers development of other elements – the needs.

4. To develop the structure of the motivational sphere, to stuff it with the meaning and complex interacting elements.

It is important to note that, when communicating, a human possesses two features which have substantial impact on the course of the communication process: affiliation, a desire to be in the company of other people, a need to build warm and emotionally meaningful relations with others and fear of rejection or ostracism. A combination of these phenomena varying in intensity forms undergraduate's motivation to communication and may take either of four types:

1. Strong hopes for affiliation combined with low sensitivity to rejection underlie student's strong need in communication. Members of this group may even seem to be obtrusive; however due to high demand and need for intensive communicational activities on a labor market, such type of motivation is desirable rather than problematic for many employers considering high demand for such specialists and a need for intensive on-the-job communicative activities. Such strong aspiration for communication should only be combined with tactfulness to be developed as an element of communicative culture.

2. Poor aspiration for affiliation among MEPhI students and strong sensitivity to rejection is an exceptionally undesirable combination as such student, either consciously or unconsciously, strives to restrict his/her contacts that could hardly be acceptable for present-day jobs.

3. Poor aspiration for affiliation and strong sensitivity to rejection is also undesirable for MEPhI students and requires correction.

4. Strong aspiration for affiliation and strong sensitivity to rejection among MEPhI students triggers an internal conflict which is certainly an impediment to efficient communicative activities and requires correction.

Therefore, we determined that we will work with four categories of MEPhI students at the stage of motivational training. We believe that at the very beginning

of the training, all students should be categorized so we could work towards the result – to develop communicative competence with due consideration of student's character.

At MEPhI motivational training in students' future professional communicative activities, we start out from the assumption that future graduates could hardly succeed in their communication when they are characterized by both poor aspiration for affiliation and strong fear of ostracism. Therefore, development of communicative competences in MEPhI students should also involve correction of their motivational behavior to allay their fear of ostracism and enhance their motivation to affiliate.

As the stage of professional training, MEPhI students should be encouraged and supported to develop their motivation for affiliation and allay their fear of ostracism. As a method for formation of communicative competence in MEPhI students, we suggest using the following scheme to support their motivation to affiliate:

1. Assess MEPhI students' aspiration for affiliation and fear of ostracism using so called Mehrabian Affiliation Tendency Questionnaire and identify the type of student's motivation to communicate. Use the questionnaire developed by the authors to identify other aspects of MEPhI students' motivation to communicate and their understanding of communication as a universal human value.

2. Write an individual plan for development of communicative needs, motives, and goals for every student. At this stage, it is extremely important to take into account the available preliminary data.

3. As a part of educational process, develop students by involving them into a communication process using interactive technologies in line with the plan so developed.

4. Assess student's communicative needs, motives, and goals so developed and identify further approach to develop his/her communicative needs, motives, and goals as individual recommendations for each student.

Therefore, at the first (basic) stage of motivational training for MEPhI students – development of motivation to communicate as a universal human value – the essential communicative needs, goals and motives should be developed with consideration of student's own motivation to communicate.

We consider that the basic motivational training, as discussed above, would be advisable for learning communication-oriented academic disciplines as they provide variety of motivational tasks, substantial time resources for motivational training and allow a teacher to match the program of lessons with that of student's motivational training.

Conclusion

The interdisciplinary approach helps to implement all didactic principles of learning, encourages a teacher to update the teaching program with interesting and current interdisciplinary topics, new social roles and communicative situations. The prospects of further research lie in description of practical implementation of the interdisciplinary approach at foreign language lessons.

Disclosure statement

No potential conflict of interest was reported by the authors.

Notes on contributors

Nadezhda N. Redchenko is a Senior Lecture at Department of Foreign Languages at National Research Nuclear University MEPhI (Moscow Engineering Physics Institute), Moscow, Russian Federation.

References

Bredneva, N.A. (2009). Project Activities in Interdisciplinary Integration. PhD Thesis. Moscow: University of the Russian Academy of Education, 264 p.

Fabricius, A.H., Mortensen, J., Haberland, H. (2016). The lure of internationalization: paradoxical discourses of transnational student mobility, linguistic diversity and cross-cultural exchange. *Higher Education*, *1*, 1-19.

Glasgow, G.P., Paller, D.L. (2016). English Language Education Policy in Japan: At a Crossroads. English Language Education Policy in Asia. *Language Policy, 11*, 153-180.

Golubev, Y.V. (2013). Formation of Cadets' Communicative Competence, *Professional education at Russia and abroad, 4(12)*, 46-50.

Gulow, W., Fritz, W. (2015). A Qualitative Approach to Analyze Intercultural Competence in Sino-German Collaborations. *Thriving in a New World Economy. Part of the series Developments in Marketing Science: Proceedings of the Academy of Marketing Science, 8.4*, 302-305.

Habók, A., Nagy, J. (2016). In-service teachers' perceptions of project-based learning. *Springer Plus, 5*, 83.

Huang, H.Ch. (2016). Openings and Closings in Intercultural Email Communication: A Case Study of Taiwanese, Japanese, and Italian Students. *Email Discourse Among Chinese Using English as a Lingua Franca*, 185-204.

Koposova, E.G. (2010). Learning Mathematics. St.Petersburg: The Herzen State Pedagogical University of Russia, 113 p.

Korhonen, V., Weil, M. (2016). The Internationalization of Higher Education: University Teachers' Competencies and Professional Development. Teaching Skills Assessments. *Lernweltforschung series, 17*, 49-71.

Lifanova, S.S. (2015). Interdisciplinary Approach to Teaching Foreign Languages for 'Auxiliary' Professions. Innovations and Multicompetence in Teaching and Studying Foreign Languages. Moscow: Nauka, 128-134.

Moloney, R., Hui Ling Xu. (2016). Intercultural Competence in Tertiary Learners of Chinese as a Foreign Language: Analysis of an Innovative Learning Task. *Exploring Innovative Pedagogy in the Teaching and Learning of Chinese as a Foreign Language. Multilingual Education*, 15, 97-114.

Perekhozheva, A.V. (2012). Formation of Professional Competence in Students of Technical Universities. Chita, 23 p.

Popova, N.V. (2011). Formation of Integrative Competences at Multidiscipline University Using Language/IT-based Tasks and Projects. *Pedagogical Education in Russia, 5*, 59-66.

Razlivinskaya, N.A. (2015). Teaching English Financial and Economic Terms for University Students Based on Interdisciplinary Approach. *Humanization of Education, 5*, 83-88.

Shahijan, M.K., Rezaei, S., Amin, M. (2016). International students' course satisfaction and continuance behavioral intention in higher education setting: an empirical assessment in Malaysia. *Asia Pacific Education Review, 17(1)*, 41-62.

Shibayev, V.P. (2008). Modelling and Organization of Interdisciplinary Integration. Stavropol, 21 p.

Sochneva, A.Y. (2011). Formation of Integrative Competences in Technical Students Using Web-based Technologies. PhD Thesis. St.Petersburg: St.Petersburg State Polytechnic University, 281 p.

Starodubtseva, O.G. (2015). Interpretation of Interdisciplinary Links in Didactic and Psychological Aspects in Teaching Foreign Language at a Non-linguistic University. *Research & Pedagogical Digest, 3(9)*, 40-46.

Uvarova, I.V., Yerina, T.F. (2015). Interdisciplinary Links in Teaching Foreign Languages at Universities. *International Journal of Applied and Fundamental Studies, 3-4*, 724-726.

Vetrova, M.I., Dmitrieva, I.L, Negro, S.V. (2015). Interdisciplinary Approach to Teaching Foreign Language at Non-linguistic Universities. *Major Rivers 2015. Proceedings of the 17th International Research & Production Forum Congress in 3 Volumes* (pp. 319-321). Nizhny Novgorod: Nizhny Novgorod State University of Architecture and Construction.

Yafizova, R.A. (2013). By an Example of Mathematics and Computer Science as Academic Disciplines. *Secondary professional education, 4*, 32-34.

Zelenkova, A.V. (2014). Formation of Teaching Competence. PhD Thesis. Kazan: Institute of Pedagogy and Psychology of Professional Education RAO, 214 p.