Developing the intercultural competence of engineering students: a proposal for the method and contents of a seminar

Detlev E. Jansen

Monash University
Melbourne, Australia

ABSTRACT: Increasing globalisation affects most sectors of society including industry, science and education. As such, people working in these fields have to be equipped with the right skills to successfully interact in intercultural settings. Since engineers work in the above quoted sectors, it is important to incorporate the necessary contents in engineering curricula. The article is based on a paper presented at the 7*th* *Baltic Region Seminar on Engineering Education*. The author outlines the reasons why engineers need to develop intercultural competence and proposes the contents and methodology of a seminar to help engineering students develop the required intercultural competences. Important concepts to be covered in this training are ethnocentrism, attributions, disconfirmed expectancies, cultural level variables, personality and culture shock. The suggested structure of the training is in the form of a seminar consisting of four modules. The first two modules are a minimum requirement and provide culture general training and are cover cultural awareness and categories. The next two modules are optional and cover culture specific knowledge. Module 3 contrasts various target cultures with students' own culture to help avoid potential misunderstanding. The final module provides specific information on a particular country.

INTRODUCTION

Globalisation, defined here as the international meshing of societies and economies, is taking place at an ever-increasing speed. Representatives of politics and private industry emphasise that international cooperation is not only important to remain competitive in a global world economy, but even indispensable in a world that can only survive through global cooperation [1].

Given that many graduate engineers internationally will encounter situations where they deal with foreign professionals or engage in work in a foreign nation, intercultural competences and empathy for foreign cultures are important aspects to be considered in engineering education [2].

A prerequisite for successful global cooperation is the development of intercultural competence. Indeed, Korhonen states that:

A professional successful in the home environment will not necessarily be equally successful when working in a new environment with a different culture. Organisations often emphasise expatriates' technical competence and experience, and ignore the non-technical knowledge and skills [1].

As a consequence, it will be increasingly necessary to integrate appropriate contents into engineering curricula in order to facilitate the development of the required skills and competences in engineering students. Given the importance of the topic, this article outlines how intercultural competences can be developed within engineering students. The article describes the aims of intercultural training, the most important concepts to be covered, as well as suggesting a structure for such training.

BACKGROUND

When growing up, every person develops a specific culture-dependent orientation of his/her perception, thinking, valuing and acting [3]. In the first decade of their lives, most people move within the frame of their own culture and they experience that the people around them follow an identical or very similar orientation. As a result, this experience leads to the conclusion that people follow similar aims and respect identical norms and values. As such, people tend to generalise their own views, behaviour and attitudes upon people of other cultures [4].

Cultural differences manifest themselves in several ways. Hofstede believes that from the many terms used to describe manifestations of culture, the following four together cover the total concept rather neatly: *symbols*, *heroes*, *rituals* and *values*. Out of this group, values form the core of culture. They are broad tendencies to prefer certain states of affairs over others. Developmental psychologists believe that most children have their basic value system firmly in place by the age of 10 [5].

Cultural standards are generated based on this. Through socialisation and enculturation (the experiences that encourage children and adolescents to become respected members of a specific culture [6]), these cultural standards are internalised to such a degree that their existence is only noticed when it becomes a stumbling block during intercultural interaction [3]. Cultural standards will vary, even among people of the same cultural group, due to the fact that every person is exposed to different external and internal influences.

The identification of one's own cultural standards is made difficult due to ethnocentrism. Sumner defines ethnocentrism as a view of things in which one's own group is the centre of everything, and all others are scaled and rated with reference to it [7]. In order to overcome these problems, it is not sufficient

to learn about another culture. Instead, this needs to be supplemented through reflective awareness of a person's own natural cultural implicitness. Appropriate training is necessary in order to avoid resulting problems in intercultural communication.

AIMS OF INTERCULTURAL TRAINING

Intercultural training should put people in a position to successfully interact with people of other cultural backgrounds. To achieve this, there need to be adaptations in the cognitive, affective and behavioural domain of the person being trained. Perception and expectation, as well as behaviour, have to be critically questioned.

Intercultural learning is a process that stretches over a long period of time and is never fully completed. It is important to be open towards things foreign to oneself and to turn to aspects at the subconscious level [3]. Knapp-Potthoff stresses that it is not sufficient to simply impart factual knowledge in order to succeed in intercultural encounters, although such knowledge might be indirectly relevant. Instead, it is necessary to impart knowledge on culture in its entirety.

However, this is not possible in learning groups since, in a class setting, entirety can not be reached because of differences in learning capacity, language skills and the like have to be considered. Therefore, one solution is to utilise a model of dynamic intercultural communication competence, which is considered to be an essential feature in the context of intercultural communication for three major reasons, namely:

- Dynamic is inherent in culture as culture is continuously changing;
- The learning process is dynamic, since the acquisition of knowledge occurs over a period of time;
- The interaction, which is the basis for communication, is dynamic.

As such, it is important to approach the direction of a foreign culture rather than to copy culture specific behaviours [8].

In summary, the specific goals of the training are as follows:

- Learn how to become aware of personal values and stereotypes;
- Become non-judgemental: display respect and empathy for other cultures;
- Learn to manage psychological stress and to communicate in a satisfactory manner;
- Focus on the differences between personal and target cultures;
- Work towards an intercultural *synergy*; figuring out which aspects of each culture provide the best solution to a given problem, thereby also achieving the integration of knowledge.

CONCEPTS CENTRAL TO INTERCULTURAL TRAINING

A good training program should cover a number of concepts whose basic understanding will lay the foundation for successful intercultural communication. Grasping these concepts will help people to better understand themselves and the other side in an intercultural encounter.

Ethnocentrism

Ethnocentrism is derived from the Greek words *ethnos* (=nation) and *kentron* (=centre). The derivation suggests that ethnocentrism, which occurs when a person perceives his/her nation as the centre of the world, is closely linked to people's sense of identity based on how they have been socialised as children [9].

When people make ethnocentric judgements about other culturally diverse individuals or groups, they impose the standards that they are already familiar with, given their own socialisation [10]. This means that ethnocentric judgements are based on feelings that one's group is the centre of what is reasonable and proper in life [6].

Attributions

When people observe behaviour of others that is different from what they would expect, they make judgements and draw conclusions so that they can explain the behaviour and make sense of their observation. Attributions refer to judgements about the cause of behaviour [11]. Internal questions centre on why people behave as they do, what reasons they have for their choices, who might influence them, how these people came to the point when they made certain choices about their behaviour, and so forth.

The attributions or judgements about the cause of behaviour are often incorrect if the observer is not aware of the behavioural guidelines of other cultures [6]. When people make attributions about an entire cultural group based on limited knowledge of a few members, they make what is called the ultimate attribution error [12].

When people learn enough about other cultures, they can make isomorphic attributions, ie they can make the same explanations for behaviour as people socialised in the other culture do. In this process, it is important to become aware of the underlying reasons why people think the way they do [6]. This results in a better understanding and fewer cases of disconfirmed expectancies, which are another concept central to intercultural training.

Disconfirmed Expectancies/Disconfirmed Messages

When people make incorrect attributions in an intercultural encounter, they may also behave incorrectly before they find out that their attributions were wrong. The discovery that both attributions and behaviour were faulty involves an added set of emotional reactions that stem from disconfirmed expectancies. The degree of the emotional upset is based on the difference between expectation and reality [6].

A similar concept is the one about confirming and disconfirming messages. Here, confirmation is defined as a process through which individuals are recognised, acknowledged and endorsed [13]. Similarly, disconfirmation occurs when strangers are denied, their experiences are denied, or their significance is denied [14].

People engaged in intercultural encounters should understand the underlying causality of their attribution and behaviour and the reaction they get based on the attribution and behaviour. They should understand that the reason for the disconfirming

expectation or message is most often cultural and not so much personal.

Cultural Variables

Cultural differences can be measured on a number of different dimensions. Some of the most important cultural variables are briefly explained in the following paragraphs.

Looking at these cultural variables it is important to keep in mind that a cultural variable can be viewed from two different levels of analysis. Next to the cultural level there is a second level, ie the individual level of analysis that is explained below. The cultural level can be used to explain a general tendency that exists in every culture for a particular variable. As an example, Figure 1 shows the hypothetical distribution of individualistic tendencies in two different cultures [9].

Individualism versus Collectivism

According to Gudykunst, individualism-collectivism is the major dimension of cultural variability used to explain cross-cultural similarities and differences in communication across cultures [9].

Individualism exists when people define themselves primarily as separate individuals and make their main commitments to themselves and their own goals. Individualism implies loosely knit social networks in which people focus primarily on taking care of themselves and their immediate families. Individualist societies are primarily based in North America and Western Europe, as well as countries strongly that are influenced by these areas.

Collectivism occurs when a group, whether familial, religious, or organisational, determines values for the members and establishes goals based on what is best for the group. Collectivist societies are primarily found in Asia, Africa, Central and South America and small Pacific island societies.

However, generalisations do not fit all cases; the trends for large numbers do suggest the following traits for individualist versus collectivist societies.

Individualists place emphasis on free will, whereas collectivists get much of their identity as members of a group. In America or Australia, for example, speaking one's mind and pursuing personal goals are seen positively and are associated with independence and bravery. However, in a collective society, such as Kuwait or Japan, similar behaviour will most likely be viewed as pushy or arrogant; emphasis is placed more on fitting in harmoniously and saving face. Interestingly, individualists expect cultures to hold certain universal values, eg democracy, but collectivists recognise that culturally different groups hold different values. Traditionally, individualist societies utilise internal pressures, eg guilt and self-respect, as a means of control, while collectivists use external pressures, eg shame.

Although no culture fully ignores individualistic or collectivistic goals, cultures differ significantly regarding which of these factors they consider to be more critical [5][6][9][10].

Time, Space and Context

Time, space and context are three very important concepts about cultural differences and were first described by Hall [15-20]. They are essential to understanding verbal and non-verbal intercultural communication, as well as behaviour, in an intercultural encounter. Hall states that:

> *Time is one of the fundamental bases on which all cultures rest and around which all activities revolve. Understanding the difference between monochronic time and polychronic time is essential to success* [15].

Monochronic time has been characterised as linear, tangible and divisible. In monochronic time, events are scheduled one item at a time and this schedule takes precedence over interpersonal relationships. On the other hand, polychronic time is characterised by *the simultaneous occurrence of many things and by a great involvement with people* [15].

A good example of polychronic time comes from the author's experience in the Middle East region. In countries of this region, the author had many business meetings in people's offices, where the office door stayed permanently open. In the middle of the conversation – often touching serious issues – subordinates would walk in and out, searching for files, wanting documents signed or just wanting to indicate their arrival or departure. Each of these actions would be superimposed by brief conversations. It was also quite common that during these open door business meetings, the Arab would yell instructions out from his desk or people would yell back requested information.
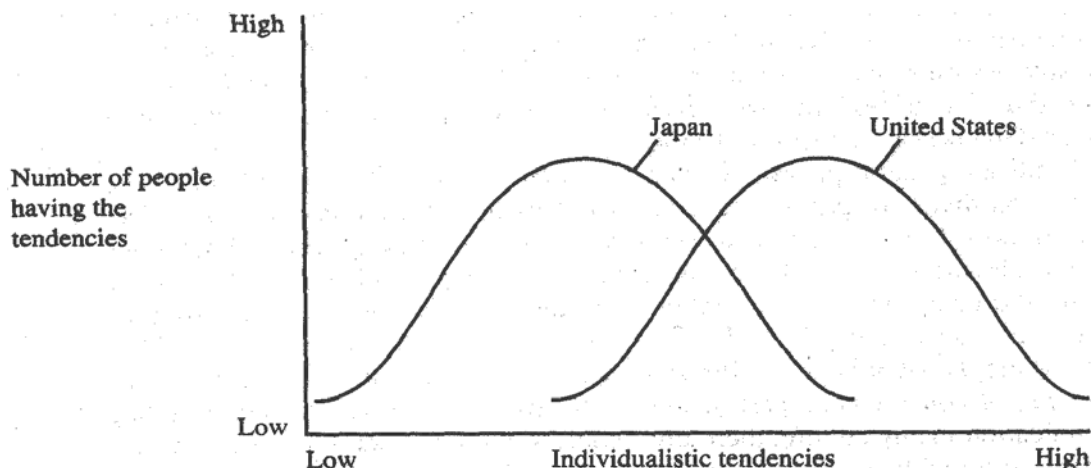

Figure 1: Individual tendencies in two different cultures (Japan and the USA) [9].

To illustrate the different concepts of time in different cultures, researchers have introduced the dichotomy of *clock time* versus *event time*. People from clock-time cultures, such as Germany or Australia, would give much attention to writing down exact appointment times and punctuality. They would also exact the same or similar behaviour of others. In an event-oriented culture, conscientious people are expected to react appropriately to unexpected demands on their time [6].

Space here refers to the invisible boundary around an individual that is considered personal. This sense of personal space can include an area or objects that have come to be considered that individual's territory.

High context versus low context refers to the amount of information that a person can comfortably manage. This can vary from a high context culture, where background information is implicit, to a low context culture, where much of the background information must be made explicit in an interaction. People from high context cultures often send more information implicitly, have a wider network and thus tend to stay well informed on many subjects. People from low context cultures usually verbalise much more background, ie they explicitly state more information in their verbal communication. They also tend not to be well informed on subjects outside of their own interests [15-20].

As already indicated, it is important to keep in mind that the cultural level can only be used to explain a general tendency that exists in every culture for a particular variable and that it is equally important to consider the personality of a human being when trying to understand intercultural communication.

Personality

Individualism and collectivism, as explained above, are cultural-level variables. These cultural-level variables are helpful in understanding general differences between people when moving from culture to culture. However, cultural-level variables only show a general summary, for example in statistics, an average can show for a population without showing the spread of the data. Similarly cultural-level variables do not show the wide differences in personalities that exist within all people of one particular cultural background. Therefore, it is important to look at the second level of analysis

that can be used to explain cognitive and affective patterns, as well as the behaviour of various people, and this involves *individual differences*. It is important to point out that there are differences in individual personality and by knowing this to avoid the pitfalls of stereotypes and prejudice.

Culture Shock

Reactions to new situations have been refereed to as culture shock [9]. It was Oberg in 1958 who first coined the term culture shock in connection with the experience of anthropologists who had to learn to manage the violation of their social reality, where this violation represented a challenge to their primary socialisation [21]. In the context of intercultural encounters, this means that being exposed to another culture will, in most cases, result in some form of culture shock.

During the process of socialisation, people unconsciously acquire certain values. Based on these values, they develop culturally induced *mental software*. On a conscious level, they experience more superficial manifestations of culture: rituals, heroes and symbols. When people enter a new culture, they have to learn all over again, like infants. This will result in culture shock [5].

According to Berger and Kellner, as well as Williams and Westermeyer, everyone requires an ongoing validation of his/her experiences, and being unable to meet this basic human need can lead to symptoms of mental, emotional and physical disturbance [22][23].

According to Hofsteede, an engineer turned social anthropologist, culture shock follows an acculturation curve that goes through four key phases, namely:

1. Euphoria (positive feelings);
2. Culture shock (negative feelings);
3. Acculturation (feelings becoming more positive again);
4. Stable state (three possibilities: better, worse or just as good as before at home) [5].

The phases of this curve can be seen in Figure 2; they reflect the feelings that have been reported by people who have been on temporary assignments to foreign cultural environments.
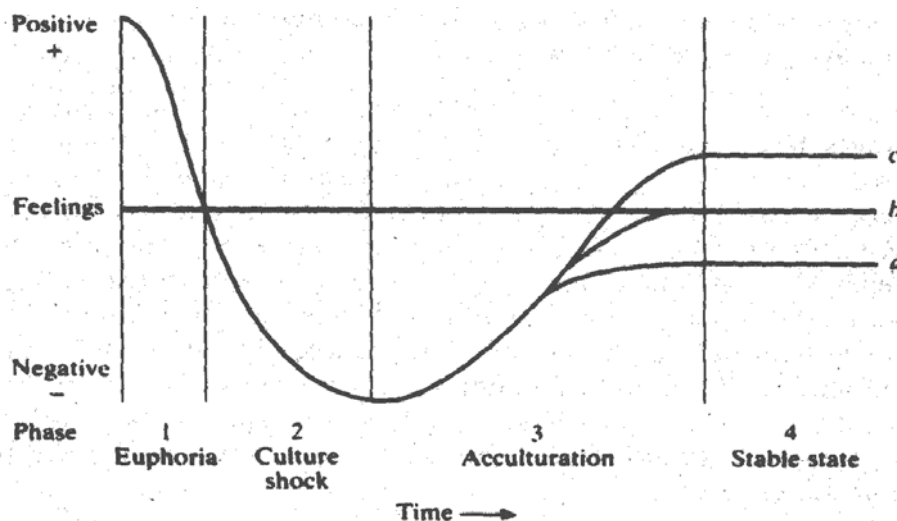

Figure 2: The acculturation curve [5].

The symptoms of culture shock may be so severe that foreign assignments have to be terminated prematurely resulting in non-completed missions and high costs. Most multinational companies expatriating their employees to foreign cultures have had some kind of these experiences. There have even been reported cases of expatriate employees' suicides [5].

Since engineering related companies are at the forefront of international business, there are many cases of engineers being delegated to foreign cultures. The possible kinds of foreign assignments can reach from prolonged stays at project sites up to full managerial responsibilities in local branch offices that can last more than three or five years. A profound and high quality preparation in regard to culture shock that an engineer receives prior to his/her foreign assignment will, in most cases, help to ameliorate the negative effects that culture shock can have and thus lay the groundwork for a successful mission that could otherwise have been a failure.

STRUCTURE OF THE TRAINING

How can a student develop intercultural communication competence? According to Hofsteede, the acquisition of intercultural communication abilities passes through three phases, namely: awareness, knowledge and skills [5]. Brislin and Yoshida proposed a similar approach supplemented with a fourth phase - emotions - interjected between knowledge and skills: awareness, knowledge, emotions (including attitudes) and skills (involving visible behaviours) [24].

Figure 3 illustrates the structure of the training, consisting of four modules where the first two are a minimum requirement and the following two are optional. The training is modular, ie each unit can be seen as a separate entity. The contents of the obligatory first two modules cover the above explained concepts central to intercultural training.
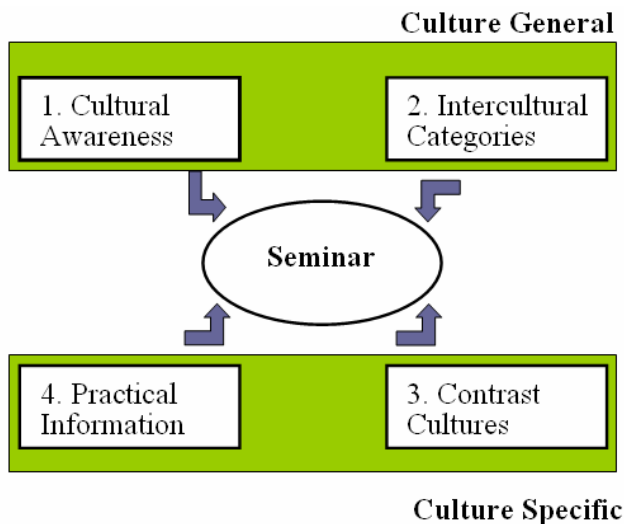

Figure 3: Structure of the training.

Cultural Awareness

Awareness is the starting point and an absolute prerequisite for the acquisition of intercultural (communication) competence. The student has to understand that he/she carries particular mental *software* because of his/her upbringing and that others brought up in a different environment carry different mental *software* [5].

Participants are made aware of the mechanisms by which they view other cultures, and how other cultures view theirs, stereotypes and prejudices included. This module also covers the concepts of ethnocentrism, attributions, disconfirmed expectancies and culture shock, and will help to raise the level of tolerance of ambiguity within students.

Intercultural Categories

As indicated above, the second phase in the development of intercultural competence is *knowledge*.

Brislin and Yoshida divide knowledge into four categories:

* Immediate concerns (visas, housing, etc).
* Area specific knowledge (history, politics, economy, current events, etc).
* Culture general knowledge (theories or themes commonly encountered regardless of the cultures involved).
* Culture specific knowledge (language, rituals and superstitions, values, time and space, etc) [24].

The module titled Intercultural Categories will impart culture general knowledge to the student. For this reason, this module will explain the concept of cultural level variables as described above, ie individualism versus collectivism, as well as time, space and context. However, depending on the length of the training (eg seminar or course), this section will be expanded to cover other important cultural level variables conceptualised by Hofsteede to categorise cultures, as well as other elementary anthropological models [5]. It will give students general knowledge about other cultures and build the foundation for learning about specific cultures, ie for acquiring culture specific knowledge, as well as area specific knowledge. Based on this module, students will more readily foresee how nationals from various countries are likely to behave and react in a specific context.

Contrast Culture Training

Contrast culture training is the first of two extra training modules that look at specific cultures and is, therefore, culture specific training. This training can only take place after it has been decided what the target cultures are, ie for what cultures people should be trained. If a number of target cultures should be covered, this training module can be quite elaborate and lengthy. The contents of this module will cover language, rituals and superstitions, values, time and space, etc, for a specific culture or a number of specific cultures (ie culture specific knowledge). It will compare these aspects of the target culture(s) with students' own culture and hence define the areas of potential misunderstandings and show ways to avoid these.

Another objective of this module is to start developing the first skill that has to be applied in a certain target culture (eg communication and conflict resolution skills). Skills are based on awareness and knowledge; they are expanded by practice. Hofsteede states that:

> *We have to recognize and apply the symbols of the other culture, recognize their heroes, practice their rituals, and experience the satisfaction of getting along in the new environment, being able to resolve first the simpler, and later on some of the more complicated, problems of life among the others [5].*

Since skills are always area and culture specific it will, in many cases, make sense that they are developed during the professional life of the engineer after it has been determined for which particular culture these skills will be required.

Practical and Detailed Information

The final module should provide students with specific information on a given target country. This can cover area specific knowledge, such as politics, the economy, current events as well as immediate concerns, including housing, the health system, schools, banking, public transport, etc. Students will be supplied with detailed material and be given pointers for further reading.

Depending on the time available for the total training, it is possible that the final two modules will be offered as electives for students who have already completed the first two modules. It is also possible that these modules are offered to experienced professionals (ie graduates already working) who have completed these modules during their university education and who now need to be prepared for a specific foreign assignment.

In order to develop the required competences, a number of training methods will be used in various seminar modules. These are in particular:

- Case studies;
- Critical incident exercises;
- Video films and interactive software;
- Role play;
- Group discussions;
- Culture assimilators;
- Simulation games;
- Experiential learning with an experienced trainer.

CONCLUSION

There is no doubt that globalisation in all aspects of life (business, education, science, leisure, etc) will continue to increase. Domestic interaction is increasingly being replaced by international and, therefore, often intercultural interaction.

In order to equip graduates for these changed requirements, new and expanded competences have to be acquired. So as to do this efficiently, new educational concepts and contents need to be developed by universities. The above approach is only one example in the methodology and contents.

REFERENCES

1. Jansen, D.E., Intercultural competence: a requirement of future professional engineers. *Proc. 3rd Global Congress on Engng. Educ.*, Glasgow, Scotland, UK, 111-114 (2002).
2. Jansen, D.E. and Riemer, M.J., The importance of emotional intelligence in intercultural communication for the global engineer. *Proc. 6th Baltic Region Seminar on Engng. Educ.*, Wismar/Warnemünde, Germany, 53-57 (2002).
3. Noesner, T., Entwicklung eines Allgemein Didaktischen Konzeptes zum Erlangen von Interkultureller Kompetenz. Unpublished MA thesis, Johann Wolfgang Goethe University, Germany (2001).
4. Thomas, A., *Interkulturelles Lernen*. In: Pollak, G. and Prim, R. (Eds), Erziehungswissen-schaft und Pädagogik zwischen Kritischer Reflexion und Dienstleistung. Weinheim, 402-423 (1999).
5. Hofsteede, G., *Cultures and Organisations: Software of the Mind* (2nd edn). New York: McGraw Hill (1997).
6. Brislin, R., *Understanding Culture's Influence on Behavior* (2nd edn). New York: Harcourt College Publishers (2000).
7. Sumner, W.G., *Folkways*. Boston: Ginn (1940).
8. Knapp-Potthoff, A. and Liedke, M., *Aspekte Interkultureller Kommunikationsfähigkeit*. München: Juridicium Verlag (1997).
9. Gudykunst, W.B. and Kim, Y.Y., *Communicating with Strangers: an Approach to Intercultural Communication* (3rd edn). Boston: McGraw-Hill (1997).
10. Adler, N.J., *International Dimensions of Organizational Behavior* (4th edn). Ohio: South Western (2002).
11. Si, G., Rethorst, S. and Willimczik, K., Causal attribution perception in sports achievement: a cross-cultural study on attributional concepts in Germany and China. *J. of Cross Cultural Psychology*, 26, 537-553 (1995).
12. Aronson, E., Wilson, T. and Akert, R., *Social Psychology: the Heart and the Mind* (3rd edn). New York: Addison-Wesley (1999).
13. Laing, D., *The Self and Others*. New York: Panthem (1961).
14. Cissna, K. and Sieburg, E., *Patterns of Interactional Confirmation and Disconfirmation*. In: Wilder-Mott, C. and Weakland, J. (Eds), Rigor and Imagination. New York: Praeger (1981).
15. Hall, E.T., *Understanding Cultural Differences*. Yarmouth: Intercultural Press (1990).
16. Hall, E.T., *The Silent Language*. New York: Anchor Books (1990).
17. Hall, E.T., *Beyond Culture*. New York: Anchor Press/Doubleday (1977).
18. Hall, E.T., *The Dance of Life*. New York: Anchor Press/Doubleday (1983).
19. Hall, E.T., *Hidden Differences: Doing Business with the Japanese*. New York: Anchor Press (1987).
20. Hall, E.T., *Hidden Differences: Studies in International Communication*. Hamburg: Gruner & Jahr (1985).
21. Oberg, K., Culture Shock and the Problem of Adjustment to New Cultural Environments. Washington, DC: Department of State, Foreign Service Institute (1958).
22. Berger, P. and Kellner, H., *Marriage and Construction of Reality*. In: Dreitzel, H. (Ed.), Recent Sociology No. 2: Patterns of Communication Behavior. New York: Macmillan (1970).
23. Williams, C. and Westmeyer, J., Psychiatric problems among adolescent Asian refugees. *Pacific/Asian Mental Health Research Center Newsletter*, 4, **3**/**4**, 22-24 (1986).
24. Brislin, R. and Yoshida, T., *Intercultural Communication Training: an Introduction*. Thousand Oaks: Sage Publications (1994).