EDITORIAL BOARD

FOREWORD

Why starting a new scientific journal? Someone might argue that two new scientific journals on pedagogy have been brought to existence in Slovakia in the last two years! It is amazing that they were founded in such a short time to develop pedagogical thinking, bring new thoughts, streams, and trends to the scientific community and to urge a shift in the Slovak pedagogical community. And that is one of the primary objectives of the third initiative – ACTA TECHNOLOGICA DUBNICAE. The motivation for starting a new journal comes from five successful years of a private university Dubnica Institute of Technology and great results in teacher training in vocational subjects and practical training and in supporting creative scientific research.

Our ambitions are high; to develop the technological aspects of education. The selection of journal topics will be based on current trends and actual demands in the pedagogical, psychological, and technological aspects of education. The objective of ACTA TECHNOLOGICA DUBNICAE is to be competitive among the existing journals, to deal with general and specific aspects of practical professional training.

The journal will follow scientific trends both at home and abroad (the international and Slovak reviewers and members of the Editorial Board) and will also offer an opportunity for discussion. The journal is a challenge for the upcoming period which will be exceptionally demanding for the scientific work due to the current financial, legal, managerial, administrative, and other issues in research and education.

*I would like to express my **pleasure** of introducing this journal and sincere **thanks** to the management of the Dubnica Institute of Technology for supporting this journal, and to wish a **successful** start on the way to the readers.*

Viola Tamášová
Editor

CONTENTS

Acta Technologica Dubnicae
volume 1, 2011, issue 1

STUDIES

How image and text semantic analysis systems can be applied for educational and teaching purposes

Jozef Stašák*

Abstract: This contribution deals with algorithm closely related to design and implementation of simple database conceptual models based on terms and principles concerned to image and text semantic analysis, while the term deterministic image is being postulated and introduced and its structure elements are described. On the other hand, the presented contribution contains a set of adequate information, how that algorithm may be applied in teaching concerned to simple database conceptual model.

Keywords: image semantic analysis, deterministic databases, non-deterministic databases.

Introduction

We live in the age of information presented to the user in different forms and via various approaches, methods and techniques. The information presented in the form of applied text, static or dynamic image, sonic or multimedia documents. On the other hand, such types of information may be combined and applied within a machine readable record or document. As a result of that, two principal questions may be postulated: *How such document content can be understood and interpreted in relation to the document user's or reader's requirements? What approaches, methods and techniques should be applied for these purposes?*

When looking for the answer to the above-mentioned questions we can consult materials closely related to computational linguistics (Bolshakov – Gelbukh), visual literacy (The Visual Literacy White Paper), the content analysis of text (Eakins – Graham) or image from semantic point of view (Harris) where algorithms based on the fuzzy set apparatus play a role of great importance (Košir

* Jozef Stašák, Dubnica Technological Institute, Dubnica nad Váhom, Slovakia; jozefstasak@yahoo.com

– Tašic; Niemeyer – Canty). However, there is a set of images with the structure which may be described via the set of deterministic relations, and which are denoted as **deterministic images**, while the types of images with the structure and behavior which shall be described by stochastic or heuristic formulas or relations are considered to be **non-deterministic images** (see also Section 2.2).

The aim of this paper is to establish or create the basis for quantification terms and principles closely related to structure, features and functionality of deterministic images with respect to design and implementation of those algorithms and application programs subsequently, which help the students to make proper simple database conceptual model. In order to achieve such an objective, several partial and subordinated aims should be fulfilled. They are postulated as follows:

- Quantification of deterministic images related to their internal and external structure elements.
- Proposal of principles related to design and implementation of simple database with the application of formulas and relations postulated within the above-mentioned quantification.

This paper consists of two principal sections. The first section (Section 2) consists of three subsections (2.1, 2.2, and 2.3). The Section 2.1 deals with terms and principles related to semantic text and image analysis, and the image (static image) is considered to be a stochastic or heuristic system. The Section 2.2 deals with quantification of deterministic images related to their internal and external structure elements, and the Section 2.3 deals with problems related to how the Image and Text Semantic Analysis Systems should be applied for learning and teaching purposes. Subsequently, these problems are further developed in Section 3.

1 How the image and text semantic analysis systems may be applied for educational and teaching purposes?

1.1 Terms and principles related to the standard image and text semantic analysis systems

Terms and principles related to the text semantic analysis

Any record or document, the content of which is represented by Text in Natural Language (hereinafter as TNL Document) consists of semantic subsets creating its principle structure elements. Such semantic subsets are called *fragments* and contain natural language sentences. Any idea represented in natural language is considered to

be a *logical sentence*. Furthermore, each logical sentence consists of *objects* and *semantic relations*, while those relations may be categorized as follows:

- Semantic relations who provide interactions among objects, objectives, living species, products, events and processes within the appropriate objects (Type A Relation).
- Semantic relations which provide interactions among objects and within TNL sentence (Type B Relation).
- Semantic relations who provide interactions among lists and reference databases (Type C Relation).

It means these relations are considered to be multifunctional. Objects and Relations of Type A and B are related to TNL internal structure and fragments and Type C Relation are concerned to TNL external structure (Stašák, 2004). Fragments' objects and semantic relations are concerned the TNL content structure, however TNL content is represented by its own lifecycle which is represented by phases postulated as follows:

- TNL-decomposition , while a set of adequate fragments is created and the fragments are categorized with respect to appropriate objectives and species;
- Extraction of words and phrases which are considered to be objects and relations. These objects are divided into three principal groups:
  - *Terms to be explained* (hereinafter as Tbe terms);
  - *Principal terms* (hereinafter as Pet terms), while they represent existing terms which enable generating Tbe terms;
  - *Relating terms* (hereinafter as Ret terms), while they represent relations among objects represented by Pet terms especially.
- Creation of lists (fragments and documents) and their categorization according to objects.
- Representation of structure related to lists and creation of semantic networks (Stašák, 2004).

The above-mentioned TNL structure and life-cycle elements create the basis for further development of TNL semantic analysis with the use of algorithms based on fuzzy set apparatus described within subsequent articles and contributions (Stašák, 2006).

Terms and principles related to the image semantic analysis

There are many approaches, methods and techniques related to the Image Semantic Analysis. However, only two approaches will be discussed in this section. *The first approach* originates in traditional methods based on standard image indexing; however problems with method type application have led to the rise of interest in techniques for

retrieving images on the basis of automatically-derived features such as color, texture and shape – a technology now generally referred to as *Content-Based Image Retrieval* (CBIR). Current indexing practice for images relies largely on text descriptors or classification codes, supported in some cases by text retrieval packages designed or adapted specially to handle images. Again, remarkably little evidence on the effectiveness of such systems has been published. User satisfaction with such systems appears to vary considerably.

CBIR operates on a totally different principle from keyword indexing. Primitive features characterizing image content, such as color, texture and shape are computed for both stored and query images, and used to identify (say) the 20 stored images most closely matching the query. Semantic features such as the type of object present in the image are harder to extract, though this remains an active research topic. Video retrieval is a topic of increasing importance – here, CBIR techniques are also used to break up long videos into individual shots, extract still *key frames* summarizing the content of each shot, and search for video clips containing specified types of movement (Eakins – Graham).

The second approach is based on image content segmentation and their representation with the use of algorithms based on fuzzy set apparatus. There exist many different formal approaches which postulate the actually investigated image into segments, while the central objects within the play an important role (Košir – Tašic; Niemeyer – Canty). An approach related to creation of meaningful image objects is based on existence of image structure. Image segments represent structure units on the first hierarchic level; however each image segment consists of objects having principal semantic meaning. These objects are called *clusters* and segments having a supplementary semantic meaning are called *gasps*.

Segments, clusters and gasps are considered to be the principal semantic units, when considering an image semantic structure. On the other hand, sets of verbal text strings – terms, which describe the principal semantic content of clusters or gasps form semantic point of view. The terms which describe the principal semantic content of clusters or gasps are called terms to be explained (Tbe-terms, principal terms (Pet-terms) and relating terms (Ret-terms) – see also previous section. However, the semantic content of clusters and gasps is modeled via fuzzy sets as well (Stašák, 2004). Segments, clusters and gasps are considered to be the principal semantic units, when considering an image semantic structure. On the other hand, sets of verbal text strings – terms describe the principal semantic content of clusters or gasps form semantic point of view. Those principles have been developed within the work closely related to

image databases (Stašák, 2004a; 2004b; 2005) and will create the basis for further sections of the paper.

1.2 Algorithm which enables generation of deterministic image structure elements

Internal and external structure of deterministic images and non-deterministic images

In general, any image structure may be represented by segments; cluster and gasp (see also Section 2.1). On the other hand, the cluster and gasp structure may have deterministic, stochastic or heuristic behavior. The images, clusters and gasps which have deterministic behavior are denoted as *deterministic images*, while the images, clusters and gasps of stochastic or heuristic behavior are denoted as *non-deterministic images.*

A set of database tables and relations which create an entire database may be considered to be deterministic image. However, one of the database tables shall be considered to be the leading database table which is closely related to other (subordinated) database tables and has a segment status, while the subordinated database tables are considered to be clusters from the image semantic analysis point of view. This concept of database structure is denoted as the database external structure (see also Figure1).

Any image segment consists of clusters and gasps, while an such image cluster may be represented by unique database table, the content created by a primary key, set of foreign keys and attributes defined by the user or designer. This concept of database table structure is denoted as database table internal structure (see also Figure 2).

Figure 1 *Database external structure*

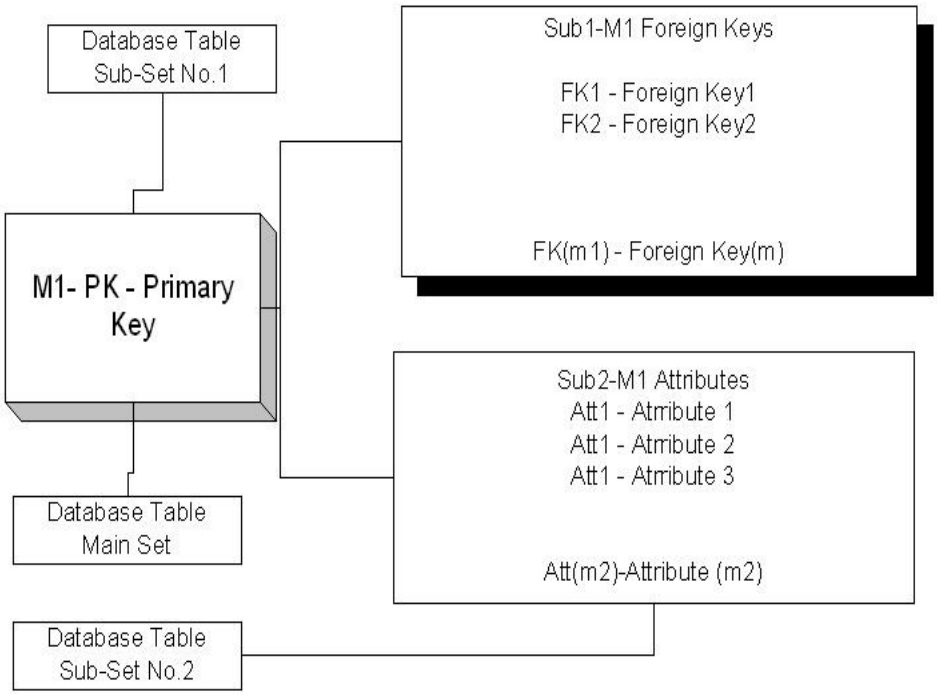


Figure 2 *Database table internal structures*

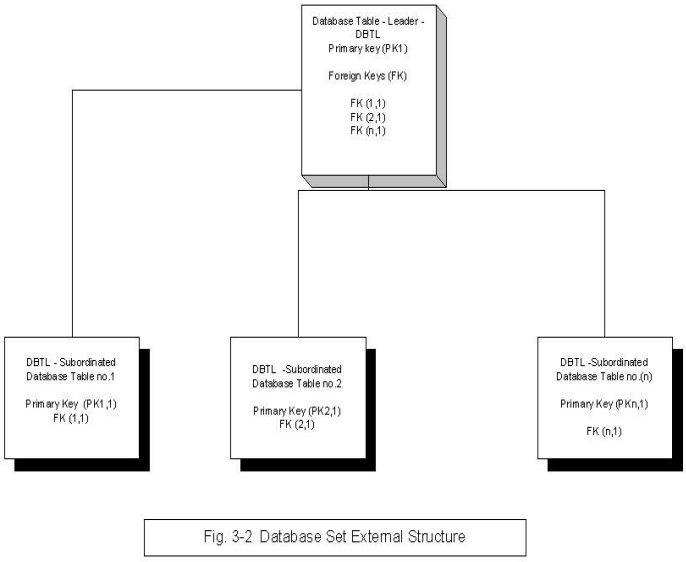


Fig. 3-2 Database Set External Structure

Quantification of deterministic images related to their internal and external structure elements

However, the clusters represent only one set of structure elements related to any image. The second important part of the image structure is created by elements denoted as gasps. When considering deterministic images closely related to database structure representation, the gasps may be represented by appropriate relations. Let us try doing a quantitative representation of database structure (database conceptual model) with the use of rules closely related to image content semantic analysis. Such representation is based on several considerations.

Consideration No. 1

Let us consider an image which consists of segment sets interconnected by set of appropriate relations, while the segment sets have an adequate pre-defined structure, e.g. database tables. Any database table content is created by the primary key, a number of foreign keys and attributes which represent database content. On the other hand, the primary key and the foreign keys play a role of principal importance, when creating adequate relations among the pre-defined database tables.

In other words, the segments represented by database tables have a pre-defined structure represented by a set of attributes including the primary key and foreign keys. On the other hand, they are mutually interconnected, while the set of appropriate principles and rules shall be respected there. With respect, the above-mentioned considerations on such a segment may be represented by the set which consists of three sub-sets (see also Figure 1), while the first subset contains elements denoted as keys (primary key) the second subset contains (an appropriate number of foreign keys) and the second one contains an appropriate number of different type attributes which represent the database semantic content alone. Both of the above-mentioned subsets create a *total database table semantic content*.

However, a database table is considered to be an image with strictly pre-defined internal structure and the image is considered to be an integral part of any larger image which represents the entire database. The image is considered to be the sub-image of the database image (see also Figure 2).

Consideration No. 2

Let us have applied an approach related to semantic structure of image based on existing Image Segments and Clusters (Stašák, 2004).

Img = {Sg (1), Sg (2)………..Sg (n)} (1.1)
m_1 – number of clusters within one image segment
m_2 – number of gasps within one image segment

Sg(1) ={[(Cl (1, 1), Gsp (1, 1))], [(Cl (1, 2), Gsp (1, 2))]............... [(Cl (1, m_1), Gsp(1,m_2))]
Sg(2) ={[(Cl (2, 1), Gsp (2, 1))], [(Cl (2, 2), Gsp (2, 2))]............... [(Cl (2, m_1), Gsp(2,m_2))]
……………………………………………………………........... (1.2)
Sg(n) ={[(Cl (n, 1), Gsp (n, 1))], [(Cl(n, 2), Gsp(n, 2))]............... [(Cl (n, m1), Gsp (n, m_2))]

Consideration No. 3

Let us consider a database DB_GEN (General Database) which consists of (n) database tables postulated as follows:

- DBGE (0) – database table which contains a set of principal data related to any object and is considered to be the database leading table.

- DB_NO1 – database table which contains a set of data, the database table is subordinated to DBGE – database table.
- DB_NO2 – database table which contains a set of data, the database table is subordinated to DBGE – database table.
- …….
- DB_N (m_1) – database table which contains a set of data, the database table is subordinated to DBGE – database table.

The database to be investigated contains one hierarchical level only (see also Figure 2). The DBGE-database is represented by an image which is denoted DBGE-database, while the image consists of (m1) segments postulated as follows:

- DBTGE (1) _Img – image segment which corresponds to DBGE-database table.
- DBTGE (2) _Img – image segment which corresponds to DBGE-database table.
- …….
- DBTGE (m_1)_Img – image segment which corresponds to DBGE-database table

and the formulas (1.3a … 1.3e) may be postulated as a result of that

$$\text{Image} = \{\text{Seg}(1), \text{Seg}(2) \ldots \text{Seg}(m_1)\} \quad (1.3a)$$
$$\text{Seg}(1) = \text{DBGE}(0)\ \text{\_Img} \quad (1.3b)$$
$$\text{Seg}(2) = \text{DBGE}(1)\ \text{\_Img} \quad (1.3c)$$
$$\text{Seg}(3) = \text{DBGE}(2)\ \text{\_Img} \quad (1.3d)$$
……..
$$\text{Seg}(m1) = \text{DBGE}(m_1)\ \text{\_Img} \quad (1.3e)$$

Any of the above-mentioned segments represented by appropriate database tables consists of subordinated segments, while Seg(1) = DBTP_GE(0) is considered to be a leading segment or database table and the following three segments (see also formulas 1.3c, 1.3d and 1.3e) are considered to be the segments subordinated to segment Seg (1) – and the following formulas may be postulated:

$$\text{Seg}(1) = [\text{Seg}(2) \ldots \text{Seg}(m_1)] \quad (1.4)$$

If formula (2.3b) is valid and Figure 2 is being respected, the following premise may be postulated:

If Seg(1) = DBGE(0)_Img $\Rightarrow$ Seg(1) = Π Seg(i+1) (for i=1….m_1)) & Seg(i+1) = =Π {[Cl(i+1, j), Gsp(i+1,j)]} (for i=1….m_1 and j=1…..m_2) (1.5a)

while further appropriate assumptions shall be considered and respected

Cl (i, 1) – contains DBTP – database table primary key
Cl (i, j) – contains DBTP – database table foreign keys (j=1….k) (1.5b)
Cl (i, k+1) – contains DBTP – database table attributes (k=1….m_2)

Let us introduce the following equation:

Gsp (i,j) = {[(PK(i), (FK(i, j))], [(PK(i+1),FK(i+1,j)]} (1.6)
For i=1 ….n, j=2….m_1,

This equation is considered to be a deterministic image gasp structure representation and may be postulated with respect to formulas (1.5a) and (1.5b) while the entire image structure is represented by formula (2.7).

{Img} = Π {[(Seg (1)), Gsp (i, j), Seg (i)} (1.7)
For i=1 ….n, j=2….m_1

Now, let us analyze a segment denoted as Seg (1). The segment contains two subordinated clusters Cl (1, 1), Cl (1, 2) and Cl (1, 3). The first cluster, denoted as Cl (1, 1) contains only one element which is represented by the primary key which is closely related to Seg (1). However, the second cluster, denoted as Cl (1, 2) contains a foreign key which corresponds to number of segments subordinated to Seg (1) as well. The second cluster, denoted as Cl (1, 3) contains attributes proposed by the database designer (see also Figure 2). Let us try to express any database image {Img} (see also formula (2.7) via model based on linguistic approach which is based on existing of Tbe, Pet a Ret terms (see also section 2.1). The Pet terms are considered to be the Principal terms which the Tbe (terms to be explained) are derived or generated from. The above-mentioned Pet terms are closely related to Cl (1, 1) and Cl (1, 2) content, while the following formulas may be postulated:

Pet (1, 1) = [Pk (1), Fk (1, 1)] (1.8a)
Cl (1, 1) = Pet (1,2) = [Pk(1), Fk(1,2)] = Pet (i, j) ={[Pk(i), Fk(i,j)
For i=1 and j=1….n
Pet (1, n) = [Pk (1), Fk (1, n)]
Cl (1, 2) = Pet (2, 1) = [Pk (2), Fk (2, 1)]
Cl (1, 3) = Pet (3, 1) = [Pk (3), Fk (3, 1)] (1.8b)

……
Cl (1, n) = Pet (n, 1) = [Pk (n), Fk (n, 1)]
Tbe (i, j) = Cl(1, 1) ⊗ Cl(1,n) = {[Pk(i), Fk(i, j)]} ⊗ {[Pk(i'), Fk(i',j')]}
Tbe (1,2) = [Pk(1), Fk(1, 1)] ⊗ Pk(2), Fk(2, 1)] = [(Pk(1) ⊗ Pk(2))], [(Fk(1, 1) ⊗ Pk(2))], [(Pk(1) ⊗ Fk(2, 1))], [(Fk(1,1) ⊗ Pk(2))]

[(Pk (1) ⊗ Pk (2))] = ∅ – this product has no semantic meaning;
[(Fk (1, 1) ⊗ Pk (2))] = ∅ – this product has no semantic meaning;
[(Pk (1) ⊗ Fk (2, 1))] ≠ ∅ – Pet (1, 2) meaningful semantic relation between Seg (1) and Seg (2);
[(Fk (1, 1) ⊗ Pk (2))] = ∅ – this product has no semantic meaning;

Similar formulas may be derived, generated and interpreted for further relations which are described within the Section 2 of the paper.

1.3 Terms and principles related to image and text semantic analysis systems applied in e-learning systems

In general, Image and Text Semantic Analysis Systems cover a large area when considering their practical application while semantic analysis of images may be applied to analyze different types of images (deterministic or non-deterministic) as well. However, an image structure may be described via pre-defined deterministic relations and the type of images is denoted as *deterministic images*, the image structure which can be described via stochastic or heuristic relations is denoted as *non-deterministic images.* Both types of images may be applied in educational or teaching processes. The deterministic images may be applied in teaching courses closely related to management or business processes and their information support, like the business process modeling and their information support modeling, e.g., problems of database models especially, where e-learning system plays an important role, are discussed in this paper. The set of steps, the principles related to the Image and Text Semantic Analysis Systems, when providing database conceptual, logical and physical model and when explaining it within the appropriate course are also analyzed here. However, we are doing our best to answer the question: "Why the Image and Text Semantic Analysis Systems are considered to be an important part of E-learning Systems?"

2 Design and implementation of image and text semantic analysis applications and systems related to deterministic images

2.1 Example of design concerned to conceptual model related to any simple one-level database

Let us consider a database DB_Pers (Database Person) which consists of four database tables postulated as follows:

- DBTP – database table which contains principal data related to any personality and is considered to be the database leading table.
- DBTE – database table which contains data concerned to education for any personality, the principal date of whom are being stored in the DBTP database table.
- DBTS – database table which contains data concerned to branch of specialization for any personality, the principal date of which are being stored in the DBTP database table.
- DBTL – database table which contains data concerned to foreign language knowledge for any personality, the principal data of which are being stored in the DBTP database table.

The DB_Pers database is represented by the image which is denoted as DB_Pers_Img, while the image consists of four segments postulated as follows:

- DBTP_Img – image segment which corresponds to DBTP-database table.
- DBTE_Img – image segment which corresponds to DBTE-database table.
- DBTS_Img– image segment which corresponds to DBTS-database table.
- DBTL_Img– image segment which corresponds to DBTL-database table.

The formulas (2.1a … 2.1e) may be postulated as a result of that.

Image = {Seg (1), Seg (2), Seg (3), Seg (4)} (2.1a)
Seg (1) = DBTP_Img (2.1b)
Seg (2) = DBTE_Img (2.1c)
Seg (3) = DBTS_Img (2.1d)
Seg (4) = DBTL_Img (2.1e)

Any of the above-mentioned segments represented by the appropriate database tables consists of subordinated segments, while Seg (1) = DBTP_Img is considered to be a leading segment or database table and the following three segments (see also formulas 1.1c, 2.1d and 2.1e) are considered to be the segments subordinated to segment Seg (1) – see also formula (1b) and the following formula may be postulated:

Seg (1) = [Seg (2), Seg (3), Seg (4)] (2.2a)
Seg (1) = [Rel (1, 2), Seg (2)] (2.2b)
Seg (1) = [Rel (1, 3), Seg (3)] (2.2c)
Seg (1) = [Rel (1, 4), Seg (4)] (2.2d)

Any of the segments denoted as Seg (2), Seg (3) or Seg (4) consists of appropriate clusters (see also Figure 1) while the following formulas may be postulated:

Seg(1) = [Cl (1, 1), Cl (1, 2), Cl (1, 3)] (2.3a)

where

Cl (1, 1) – contains DBTP-database table primary key
Cl (1, 2) – contains DBTP-database table foreign keys
Cl (1, 3) – contains DBTP-database table attributes
Seg (2) = [Cl (2, 1), Cl (2, 2), Cl (2, 3)] (2.3b)

where

Cl (2, 1) – contains DBTE-database table primary key
Cl (2, 2) – contains DBTE-database table foreign key
Cl (2, 3) – contains DBTE-database table attributes
Seg (3) = [Cl (2, 1), Cl (2, 2), Cl (2, 3)] (2.3c)

where

Cl (3, 1) – contains DBTS-database table primary key
Cl (3, 2) – contains DBTS-database table foreign key
Cl (3, 3) – contains DBTS-database table attributes
Seg (4)= [Cl (4, 1), Cl (4, 2), Cl (4, 3)] (2.3d)

where

Cl (4, 1) - contains DBTL-database table primary key

Cl (4, 2) - contains DBTL-database table foreign key
Cl (4, 3) - contains DBTL-database table attributes

Let us introduce the following equation:

$$Tbe\ (i, j) = Cl\ (1, 1) \otimes Cl\ (1, n) = \{[Pk\ (i), Fk\ (i, j)]\} \otimes \{[Pk\ (i'), Fk\ (i', j')]\} \quad (2.4)$$

We apply it for the above-mentioned database type in order to establish the adequate relations between the leading database table and the database table subordinated to it. There may be found two types of relations:

a) Relations which imply a proper functionality of the designed database and are denoted as *meaningful relations* or relations with adequate semantic meaning, while a product value by which the actual relation is represented *is not an empty set ($\neg\varnothing$).*
b) Relations which imply non-proper functionality of the designed database and are denoted as *meaningless relations* or relations with non-adequate semantic meaning, while a product value by which the actual relation is represented *is an empty set ($\varnothing$).*

The following set of equations may be postulated as the result of that:

$$Tbe\ (1,2) = [Pk(1), Fk(1,1)] \otimes Pk(2), Fk(2,1)] = [(Pk(1) \otimes Pk(2))], [(Fk(1,1) \otimes Pk\ (2))], [(Pk\ (1) \otimes Fk(2,1))], [(Fk\ (1,1) \otimes Pk\ (2))] \quad (2.5a)$$

$[(Pk\ (1) \otimes Pk\ (2))] = \varnothing$ – the product has no semantic meaning
$[(Fk\ (1, 1) \otimes Pk\ (2))] = \varnothing$ – the product has no semantic meaning
$[(Pk\ (1) \otimes Fk\ (2, 1))] \neq \varnothing$ – Pet (1, 2) meaningful semantic relation
between Seg (1) and Seg (2) (the same corrections for 3.5b-c)
$[(Fk\ (1, 1) \otimes Pk\ (2))] = \varnothing$ – this product has no semantic meaning
$Tbe\ (1, 2) = [(Pk\ (1) \otimes Fk\ (2, 1))] \neq \varnothing$ – Gsp (1, 2)

$$Tbe\ (1, 3) = [Pk\ (1), Fk\ (1, 3)] \otimes Pk\ (3), Fk\ (3, 1)] = [(Pk\ (1) \otimes Pk\ (3))], [(Fk\ (1, 1) \otimes Pk\ (3))], [(Pk\ (1) \otimes Fk\ (3, 1))], [(Fk\ (1, 1) \otimes Pk\ (3))] \quad (2.5b)$$

$[(Pk\ (1) \otimes Pk\ (3))] = \varnothing$ – this product has no semantic meaning
$[(Fk\ (1, 1) \otimes Pk\ (3))] = \varnothing$ – this product has no semantic meaning
$[(Pk\ (1) \otimes Fk\ (3, 1))] \neq \varnothing$ – Pet (1, 3) meaningful semantic relation
between Seg (1) and Seg (2)
$[(Fk\ (1, 1) \otimes Pk\ (3))] = \varnothing$ – this product has no semantic meaning
$Tbe\ (1, 3) = [(Pk\ (1) \otimes Fk\ (3, 1))] \neq \varnothing$ – Gsp (1, 3)

Tbe (1,4) = [Pk (1), Fk (1,4)] ⊗ Pk (4), Fk (4,1)] = [(Pk(1) ⊗ Pk(4))],
[(Fk (1,1⊗ Pk (4))], [(Pk(1) ⊗ Fk (4,1))], [(Fk (1,1) ⊗ Pk (4))] (2.5c)
[(Pk (1) ⊗ Pk (4))] = ∅ – this product has no semantic meaning
[(Fk (1, 1) ⊗ Pk (4))] = ∅ – this product has no semantic meaning
[(Pk (1) ⊗ Fk (4, 1))] ≠ ∅ - Pet (1, 3) meaningful semantic relation between Seg (1) and Seg (2)
[(Fk (1, 1) ⊗ Pk (4))] = ∅ - this product has no semantic meaning
Tbe (1, 4) = [(Pk (1) ⊗ Fk (4, 1))] ≠ ∅ - Gsp (1, 4)

When looking at formulas and equations denoted as (2.5a-2.5c), we can see, that meaningful relations may be represented by Tbe terms based on the primary key related to leading database table and foreign key related to the database table which is strictly subordinated to the leading database table (see also formulas (2.5a-2.5c). In general, any Tbe-term consists of more Pet and Ret terms, while the following equation may be postulated:

Tbe (i, j) = f [Pet (i, j), Ret (i, j)] (2.6)

With respect to the previous formulas (2.5a – 2.5c), formula (2.6) may be postulated as follows:

Tbe (1, 4) = Pet (1, 4) ⊗ Ret (1, 4) (2.7)

When considering a database image which consists of segments and gasps (see also formula (2.7) and the database image is considered to be a deterministic image, any Tbe terms are closely related to the image gasp, denoted as Gsp (i, j), while formula (2.8) may be postulated:

Tbe (1, 4) = Gsp (1, 4) (2.8)

Because of that, any Tbe term consists of Pet and Ret term and formula (2.7) is valid, the following formulas may be postulated:

Tbe (1, 4) = Pet (1, 4) ⊗ Ret (1, 4) (2.9)
Pet (1, 4) ⊗ Ret (1, 4) = Rel (1, 4) (2.10)
Tbe (1, 4) = Rel (1, 4) = Gsp (1, 4) (2.11)

With respect to the previous considerations, formulas and equations the following assertions or statements may be postulated:

Assertion No. 1

Any deterministic image may be represented by segments with an appropriate pre-defined structure based on adequate clusters and gasps, while any cluster consists of one unique (primary) attribute, more non-unique (foreign) attributes and further attributes which represent the cluster content as well. On the other hand, any gasp which creates an integral part of any deterministic image contains relations based on one unique (primary) attribute and one non-unique (foreign) attribute and provides an interconnection between the leading image segment and subordinated image segments. However, with respect of previous formulas and equations which indicate that, the above mentioned structure may be represented by Tbe, Pet and Ret terms, which create the basis for linguistic approach to deterministic image representation.

Assertion No.2

The results concentrated in Assertion No.1 entitle us to postulate the fact, that the previous formulas and equations may be applied in designing a database conceptual model, data warehouse conceptual model or when designing models of business processes.

2.2 How image and text semantic analysis principles can be applied in teaching database course

Previous section has dealt with the quantification of deterministic images. The simple database conceptual model can be considered to be such an image. In Section 2.3, there is postulated the following question: "Why Image and Text Semantic Analysis Systems are considered to be important part of E-learning Systems?" Let us try to find an answer to this question.

We should think in two directions when looking for the answer. The first direction is closely related to database conceptual model design and the second direction is concerned to check and control of the database conceptual model design, especially when looking for an answer to the following question. "*Are primary and foreign keys, which create an integral part of any database table design together with appropriate relations proposed correctly and is their functionality suitable?"*

When looking for an answer to *the first direction*, the database designer is required to determine a number of database tables which should create the total database content image and establish the leading database table. After that, he/she is able to get the answer how the leading database table shall be designed from primary key view and

how many foreign keys shall be contained in the database table. On the other hand, when considering the database tables subordinated to the leading database table, the designer gets the appropriate information how the primary and foreign keys shall look like in order to create an adequate relation properly.
Finally, the designer gets the information how the actual relation shall be designed correctly. When looking for an answer to *the second direction*, the database designer is required to present the actual database conceptual model together with appropriate primary and foreign keys and also with adequate relations among actual database tables in order to evaluate semantic meaning and correctness of a designed relation which plays a role of principal importance within any database conceptual model, while the formulas (2.5a-2.5c) are important for these purposes. On the other hand, the design and implementation of an appropriate application program operating based on this algorithm is a matter of principal importance.

Conclusion

The paper presented deals with the application of image semantic analysis principles in educational and teaching process, especially how these principles may be applied when explaining problems of simple database conceptual model. With respect to the requirement, a special type of image denoted as a deterministic image was postulated. Its clusters and gasps have an appropriate pre-defined structure described via adequate deterministic relations.

As a result of that, an adequate algorithm related to the design and implementation of simple database conceptual model when considering construction of appropriate relations based on primary and foreign keys, where the students – beginners in these branches, make most mistakes. However, the information in Assertion No.1 and Assertion No. 2 together with information in Section 3.2 can be also useful for them. The designed algorithm can be further developed and applied for more complicated database conceptual models.

References

BOLSHAKOV, I., GELBUKH, A. *Computer Linguistics – Models, Resources, Applications.*
http://www.gelbukh.com/clbook/Computational-Linguistics.htm
DOWNIE, J. S. *Text Analysis.*
http://lucian.uchicago.edu/blogs/dhcs2008/category/text-analysis/
EAKINS, J., GRAHAM, M. *Content-based Image Retrieval*.
http://www.buddies.org/articles/THESIS.DOC

HARRIS, R.: *Semantics 1*. http://www.virtualsalt.com/think/semant1.htm

KOŠIR, A., TAŠIC, J. *Formal system for digital image scene analysis*. http://Idos.fe.unilj.si/docs/documents/20021009132908_andrejk.pdf

NIEMEYER, I., CANTY, M. J. *Knowledge-Based Analysis of Change Images by Object Oriented Post Classification.* http://ww.innemeyer.de/publications/urs01nie.pdf

STAŠÁK, J. 2004a. Application of Fuzzy Sets Apparatus in Image Semantic Analysis. In *Proceedings of the 5th International Carpathian Control Conference*. Krakow: Faculty of Mechanical Engineering and Robotics, 2004, p. 255-260.

STAŠÁK, J. 2004b. A Contribution to Semantic Text Analysis (Section 2.1 and 2.2). In *Electronic Computers and Informatics ECI*. Košice: The University of Technology, Department of Computers and Informatics of FEI, 2004, p.132-144.

STAŠÁK, J. 2004c. Data and Information Delivery Evaluation and Modeling Using Fuzzy Sets. In *Acta Facultatis Aerarii Publici*, vol.1-2, 2004, p. 268-274.

STAŠÁK, J. 2004d. A Contribution to Image Semantic Analysis. In *Informace na dlani*. Praha: Albertina Income Praha s.r.o., 2004.

STAŠÁK, J. 2005. Image Databases Designed and Implemented Based on Fuzzy Set Algorithms. In *Proceedings of 6th International Carpathian Control Conference ICCC 205, volume I*. Miskolc-Lillafured, 2005, p. 419-430.

STAŠÁK, J. 2006. Modeling of Text Semantic with the use of Fuzzy Sets. In *Ekonomičny vistnik NTUU*, 2006, n. 3, p.376-384.

The Visual Literacy White Paper. http://www.adobe.com/uk/education/pdf/adobe_visual_literacy_paper.pdf

Acta Technologica Dubnicae
volume 1, 2011, issue 1

School climate as the determinant of the relationship between the level of students' resilience and school satisfaction

Viola Tamášová – Silvia Barnová*

Abstract: Resilience is an individual's capacity to recover, adapt, and keep mental balance and normal functioning when exposed to significant adversity. This competence plays an important role in one's life because it increases the probability of achieving success in various spheres of life. Schools can foster students' resilience by providing a positive school environment and a sufficient number of protective factors, but it is the subjective interpretation of conditions and experiences rather than the exposure to them that is significant. The main objective of this research was to study to what extent school satisfaction, i.e. subjective interpretation of the school climate, influenced the level of students' resilience. Not all our findings are compatible with the results of other studies. Despite the limits of our research, its results can serve as a basis for further work as not much has been done in the field of resilience research in Slovakia.

Key words: school climate, resilience, coping, risk factors, protective factors.

Introduction

During their lives, people must deal with more or less serious problems, intrapersonal and interpersonal conflicts, stressful situations, and other adverse circumstances that can negatively influence one's healthy development. They are called risk factors and they increase the probability of negative developmental outcomes and problem behaviors of students. Under their influence one's reactions are often unusual, not relevant to the given situation.

There is a large scale of internal and external factors that can help a person to adjust to changing conditions and to deal with adversity. The present risk factors are in interaction with protective factors that can serve as a buffer to risk factors, to interrupt

* Viola Tamášová, Dubnica Technological Institute, Dubnica nad Váhom, Slovakia; tamasova@dti.sk
Silvia Barnová, Dubnica Technological Institute, Dubnica nad Váhom, Slovakia; silvia.barnova@yahoo.com

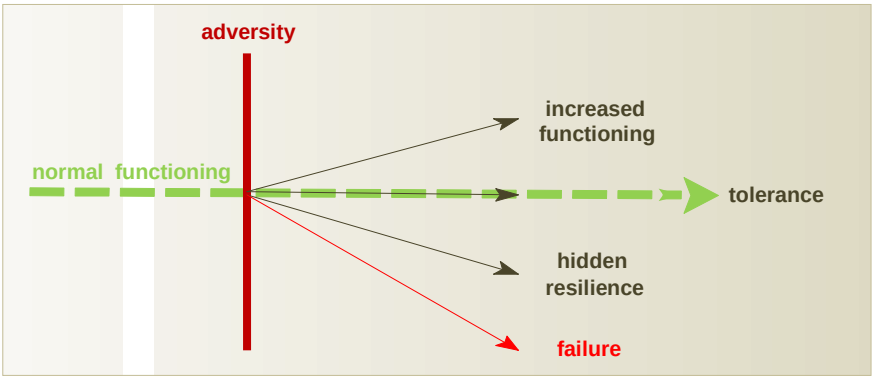
cumulative effects of risk, and may intervene to prevent a risk factor from having an effect (Barter, In Ungar, 2005, p. 348). The protective factors often create chains, complement one another, and have effect only in combination with the risk factors. The more stressors are present, the more protective factors are needed to counterbalance the negative effects of the environment. When confronted with new but manageable stressful life events, individuals widen their repertoire of coping strategies and later they are able to master the pressure they encounter when exposed to adversities. In this way they become less vulnerable, i.e. resilient.

Resilience is a special type of competence that can be fostered by every environment in which a person is situated. It is an individual's capacity to recover, adapt, and keep mental balance and normal functioning despite the exposure to various challenges: some are acute, occurring once, others are chronic and part of one's daily life (Ungar, 2006, p. 3). Resilience can be observed only when there is a significant threat to the individual, typically indexed by high-risk status or exposure to severe adversity or trauma (Masten – Coatsworth, 1998, p. 206).

It is now generally accepted that the capacity to overcome adversity varies from individual to individual. In this context we recognize four basic types of reactions to significant adversities:

a) tolerance – individuals maintain functioning despite stressors;
b) increased functioning – individuals can do even better than normally despite harsh; circumstances, exposure to adversity has a "steeling" effect on them;
c) hidden resilience (Ungar, 2006, p. 82) – there is an actual decline in functioning but the individual "survives"; hidden resilience is often associated with antisocial behaviors which are used as a coping strategy;
d) a failure.

Figure 1 *Levels of functioning* (Barnová, 2010, p. 49)



Physical and social ecologies in which people are situated have a great influence on their members and function as a potential source of both protective and risk factors. Everyday situations are never all bad or all good; they are a mixture of both favorable and unfavorable conditions. What makes experiences positive or negative is the individual's subjective interpretation of events, rather than the exposure to them. Situation appraisal is influenced by one's personal history and the actual context.

Due to their lack of experience, children and adolescents are vulnerable and are often among the most severely affected by adverse circumstances, therefore, adults are in charge of structuring such various social environments that support them in the process of acquiring knowledge, skills and experience necessary for successful participation in social life, and effective problem solving. Schools can promote students' resilience by offering a whole scale of protective factors in their environments and by maximum possible stress reduction. These are among the features of a positive school climate that is characterized by loyalty, trust, support, dynamics, expectations, and communication (Fisher, 2004), as opposed to school environments with a lot of fear, insecurity, and unreasonable conflicts. Examples of unsafe, unsecure school environments are schools, where bullying is tolerated (Tamášová, 2008, p. 39). From the school climate point of view, it is the quality of relationships inside the school that plays a significant role.

School satisfaction is a consequence of students' expectations and experiences; therefore there is a close relationship between school satisfaction and school climate. Every student spends several hours a day at school and for his/her development the fact whether he/she perceives this time as pleasant and meaningful or a waste of time is crucial. Positive school climate is one of the most important protective factors that a school can offer. S. Hlásna (2007, p. 253) characterizes the quality of students' life in a class as the subjective interpretation of objective circumstances of the quality of school

life and the quality of life in the class. It is mostly influenced by the positive impact of the school, positive relationships with teachers, quality of education, importance of school in students' lives, social factors, and students` self/esteem.

We can say that resilience is one of key competences as it is not only crucial when solving actual problems but its development increases the individual's capacity to perform well when adversity occurs in future and brings heightened likelihood of success in school and other life accomplishments. Though a lot of resilience research has been done abroad, unfortunately, not much attention has been paid to it in Slovakia. That is the reason why we decided to study the extent to which school satisfaction, i.e. subjective interpretation of school climate, influences the level of students' resilience.

2 Research objectives

The objective of our research was to study the levels of student resilience, their school satisfaction, and the extent to which school satisfaction, i.e. subjective interpretation of school climate, influences the level of students' resilience.

3 Methodology

3.1 Research tools

For the purpose of our research we decided to use the following tools: Gail M. Wagnild and Heather M. Young's THE RESILIENCE SCALE™ and a questionnaire. The Resilience Scale™ is an instrument to measure resilience as an important psychological factor. It is a tool based upon scientific research which was translated from the English original and the Slovak version was adapted to Slovak cultural settings by the Institute of Humanities in the Faculty of Education of Comenius University in Bratislava. It is a 25-item scale that measures resilience as a positive personality characteristic enhancing individual adaptation, i.e. the ability to cope with change or misfortune successfully. All items are worded positively and reflect accurately the statements made by participants in the initial study on resilience conducted by Wagnild and Young.

To measure students' subjective interpretation of school climate we created our own questionnaire because none of the available tools were suitable for our research. It consists of ordinal scales. The first version of the questionnaire was sent to three experts for evaluation two of whom made a range of comments. After the modification, the questionnaire was pilot-tested. The questionnaire consists of 50 closed questions

divided into 7 smaller questionnaires: “Relationships”, “In this school there is at least one teacher who ...”, “Our teachers ...”, “School”, “My class”, “I have at least one schoolmate who ...”, and “My friends at school”. In the first four parts we studied the conditions created by schools and teachers, i.e. things that cannot be much influenced by students if they do not have a chance to take part in decision making. In the last three parts we focused on student relationships. The collected data were sorted in MS Excel and we used PASW Statistics (formerly SPSS) for the statistical analysis.

3.2 Research sample

The research was conducted in three secondary grammar schools: a private school in Bratislava, a religious school in Ilava District, and a public school in Pezinok District. We used convenience sampling as it was very difficult to find schools willing to take part in the research. All three schools are recognized by public as offering high standard education and achieving good results. Our objective was to find a secondary grammar school in the capital and two schools in two different regions of Slovakia because of the differences in lifestyle in various parts of Slovakia and the number of risk factors to which students are exposed. Another criterion was that we were looking for a public, a private, and a religious school. The reason for choosing secondary grammar schools was that all of them offer more or less similar educational programs and their students must pass entrance examinations. These facts made the sample more consistent. There were 320 respondents; all of them were 10^{th} and 11^{th} grade students.

4 Results

Respondents who did not fill in the identification data in the research tools were excluded from the research. The same was applied to students who did not indicate their answers for all the items in The Resilience Scale™.

School	**10th grade**	**11th grade**	**Together**
Public school in Ilava District	56	80	136
Religious school in Pezinok District	44	55	99
Private school in Bratislava	32	25	57
Together	***132***	***160***	***292***

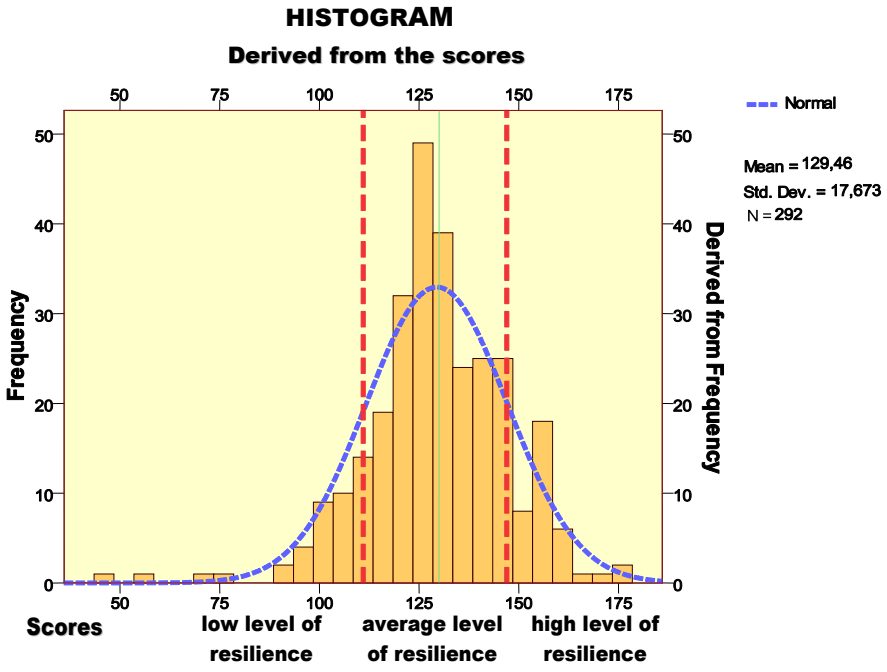
Table 1 *The final sample*

4.1 The Resilience Scale™

In the next step we started coding the collected data. Answers to all items in The Resilience Scale™ are scored from 1 (Strongly Disagree) to 7 (Strongly Agree). Scores range from 25 – 175. The higher the final score is, the more resilient the student is. Based on their scores from The Resilience Scale™, we divided the respondents into three groups the following way:

1. we found the mean (= 129) and the standard deviation (= 18)
2. we found the intervals for different levels of resilience (μ – σ)
   - low level of resilience – score range 25-110
   - average level of resilience – score range 111-147
   - high level of resilience – score range 148-175

Figure 2 *Levels of resilience*



Further on, we worked with two groups of students: students with low level of resilience and the group of students with average and high levels of resilience. We presumed that both students with average and high levels of resilience had the capacity to cope with adversity and could easily adjust to changing conditions. The only difference could be that highly resilient students could do so even more easily than students with average level of resilience.

4.2 Questionnaire

Each part of the questionnaire was evaluated separately. We used the following method of coding:

Answer	**Code**	
	positive statement	negative statement
no	-2	2
probably no	-1	1
I don't know or no answer	0	0
probably yes	1	-1
yes	2	-2

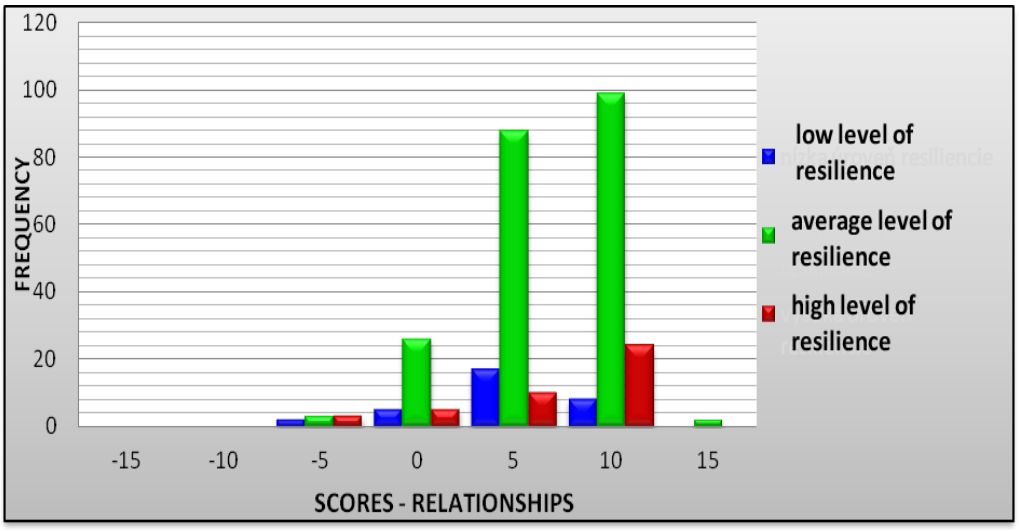
Table 2 *Coding*

We decided to apply this system of coding because the scores of every part of the questionnaire, as well as it is in the case of the questionnaire as a whole, show whether the given respondent perceives the examined characteristic of the school climate as positive or negative. There are 8 items with negative formulation in the questionnaire. We grouped the data according to students' resilience levels (see Section 4.1) and for every group found the mean, variance, constructed frequency tables, charts and we started statistical data analysis. We used the non-parametric Kruskal-Wallis test for independent groups and the Mann-Whitney test for independent groups (both tests at significance level $\alpha = 0.05$).

In the first part of the questionnaire we studied students' perception of relationships inside their schools, we were interested in the fact, whether their schools offer students positive and safe environment or not. Only 11.64% of all students achieved a negative score. Our findings show that students with low level of resilience perceived school relationships less positively (median score = 3) than their schoolmates with average or high levels of resilience (median score = 5). Based on these findings, we assume that the subjective interpretation of the quality of relationships in school, acceptance by

other members of the community, student satisfaction, and safe school environment are among the determinants that are closely connected with the level of resilience of the students.

Figure 3 *Questionnaire Part 1 – Relationships*

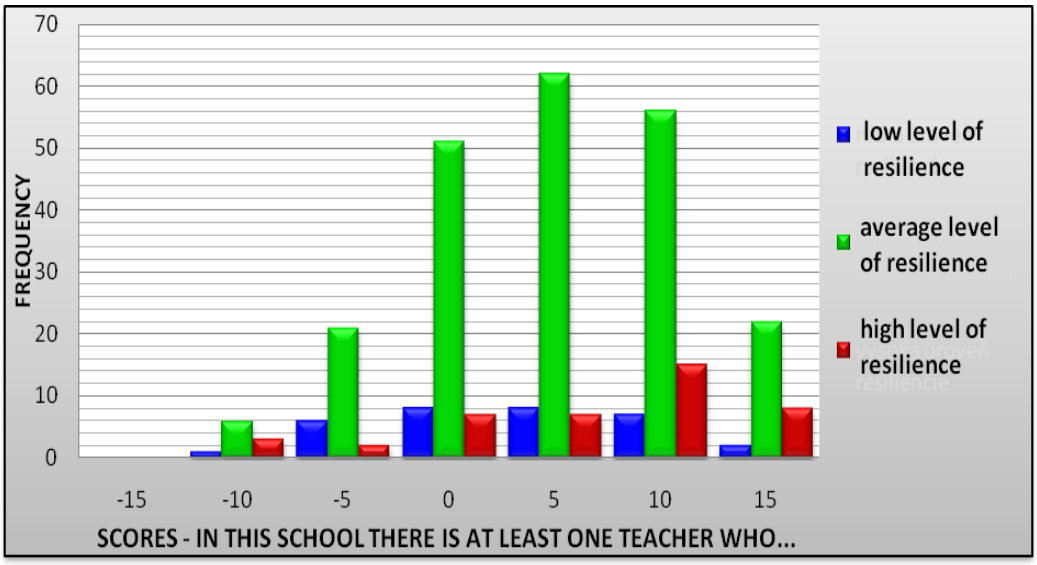


More positive perception of the school climate by the students with average and high levels of resilience in comparison to students with low level of resilience can be explained by the fact that they are able to adapt to new environments more easily. Therefore they could have perceived the new school conditions that they found unpleasant when entering the school as an inevitable part of school life and a challenge that they had to deal with. Resilient students gradually enlarge the scale of their coping strategies. We assume that this ability is the major contribution to a more positive perception of their school environment. What is more, resilient students are able and willing to take part in decision making, i.e. they actively participate in the process of creation of their school environment, and thus the conditions suit their needs.

Not every student is able to cope with adversity without an adult's assistance and it does not matter, how serious their problems are. Unfortunately, it is not unexceptional that there is no one who students can ask for help outside the school; there is no one who they can talk with. In the second part of the questionnaire we asked students if they have a supportive teacher at school who encourages them and who they can go to when they are in a difficult life situation. We did not find any significant differences between students with low level of resilience (median score = 2.5) and the group of

students with average and high levels of resilience (median score = 3). The results show that the presence or absence of at least one stable and supportive teacher at school does not influence students' resilience. That means that a relationship based on mutual trust for which a teacher's interest in the student and his/her problems, willingness to listen to him/her, belief that every student is able to achieve success, and appreciation of positive outcomes do not play a significant role. We must be very careful about such an assumption because the schools participating in the research were chosen conveniently. All three schools achieved good results so with a high probability these teachers applied an individual approach to every student. Another factor to be taken into consideration is that all schools had good prevention programs characterized by a close contact between students and teachers, though not every student felt it this way.

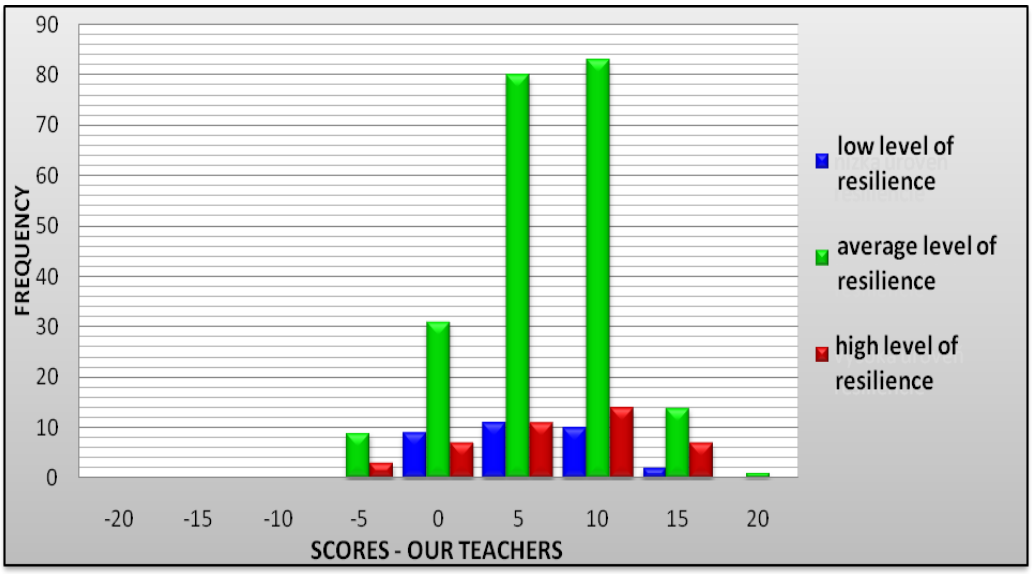
Figure 4 *Questionnaire Part 2 – In this school there is at least one teacher who...*



As we can read from Figure 4, a relatively high percentage of students (31.85%) achieved a negative score in the second part of the questionnaire, including students with high level of resilience. The answers of these students show that they did not trust any of their teachers but it is possible that they discuss their problems with the school counselor or they had a close adult outside the school, e.g. their coach, the priest, etc. It would mean that a close relationship with a teacher could be replaced by a relationship with a supportive member of the community where students live and therefore students did not feel the need to contact their teachers. The next possible explanation is that

students had some negative experience with teachers from the past or refused any kind of positive relationship because of the negative attitude of their peers or parents towards teachers in general. There are also students who can cope with challenging situations by themselves and they do not need their teachers' assistance. The third part of the questionnaire was focused on students' perception of their teachers' approach and their expectations. We asked them whether their teachers showed an effort to build equal relationships with them, if they were fair and able to confess their mistakes, and if they kept their word. These characteristics in combination with high expectations are considered to be among the important protective factors.

Figure 5 *Questionnaire Part 3 – Our teachers*

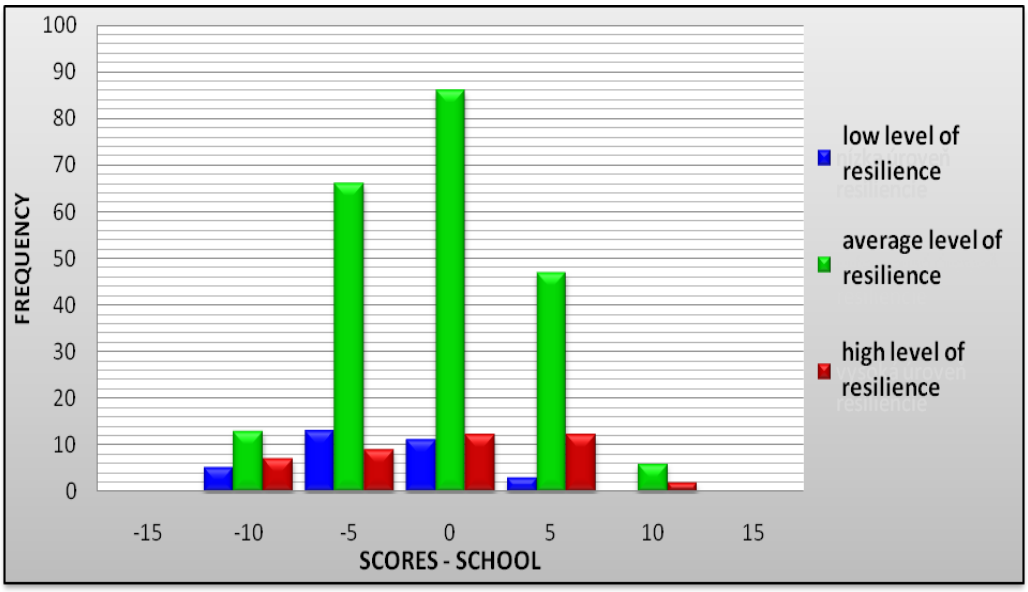


Our presumption that the more resilient the students are the more positive experiences with teachers they have was wrong. We did not find any significant differences between students with low level of resilience (median score = 3) and the group of students with average and high levels of resilience (median score = 3). Our findings are the proof of high standard of teachers' work at the schools because only a very small part of respondents (15.41%) evaluated their teachers negatively. Such a positive perception of teachers by students with low level of resilience, as can be seen in Figure 5, was a surprise to us, though the students of all three schools indicated good interpersonal relationships in other parts of the questionnaire, and thus such answers were natural. It is possible that students who were not satisfied with their teachers'

work were not objective because of an aversion towards teachers or were influenced by their parents' opinions.

The attractiveness and meaningfulness of school activities and the opportunities to participate in decision making at school level were studied by the fourth part of the questionnaire. We got less positive answers from students with low level of resilience (median score = -5) than from the group with average or high levels of resilience (median score = -3) what is in agreement with the results of several published studies. Surprisingly, as many as 69.52% of all students achieved a negative score in this part of the questionnaire, though for students it is very important to do activities they find attractive and meaningful. They want to have fun at school but at the same time they seek for knowledge and skills they can use outside the school. Teachers' creativity, application of unusual, interesting activities, new forms and methods of teaching can increase school satisfaction. Another important determinant of school satisfaction is the provision of opportunities to express opinions and to participate in decision making. The more opportunities students get, the more responsibility for their outcomes lies with them.

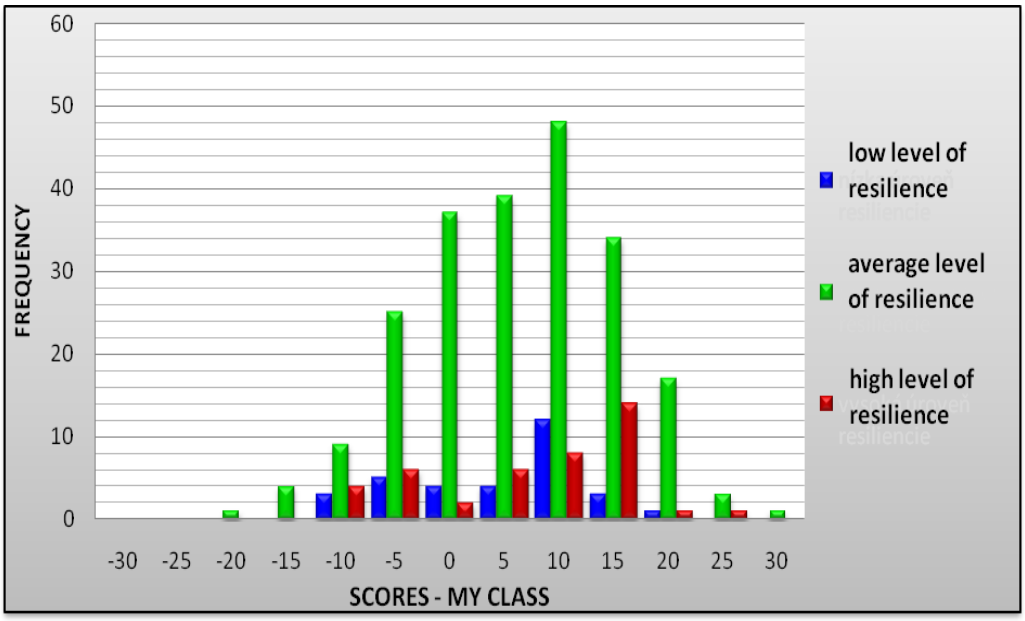
Figure 6 *Questionnaire Part 4 – School*



Students with low level of resilience perceived school activities more negatively than their more resilient schoolmates, though conditions they had were exactly the same. It means that, again, subjective appraisal plays a significant role. The question is whether it is possible that schools paid more attention to active, more resilient students achieving good results and did not respect the needs of less resilient students.

The fifth part of the questionnaire focused on class climate, tolerance and respect between schoolmates, cohesion of the class and the presence or absence of social pathology. We did not find any significant differences between students with low level of resilience (median score = 5) and students with average or high levels of resilience (median score = 5). The results show that the extent of their satisfaction in the class is not dependent on the level of their resilience. We expected that students with low level of resilience would not be happy in their class and would feel being hurt.

Figure 7 *Questionnaire Part 5 – My class*

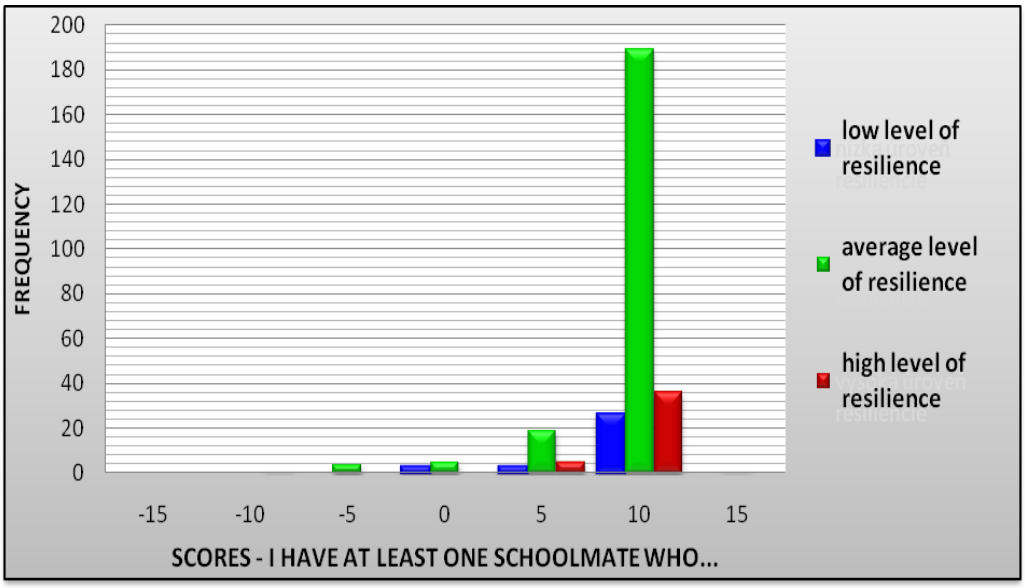


Though 31.85% of students perceived their class climate negatively, the majority of students (68.15%) were happy in their class environment. This fact supports our findings in other parts of the questionnaire because class climate is influenced by school climate and good relationships minimize the occurrence of social pathology in both the school and class environments. Teachers are responsible for class climate too;

their ability to intervene before a conflict becomes serious and willingness to help to solve problems in the class belong to the important protective factors. As students rated their teachers positively, we assume that most of them did their jobs well and tried to provide their students safe environments.

It is very important to have someone who can share one's problems and experiences with. In the sixth part of the questionnaire we asked the students if they had social support derived from intimate relationships within their class environment. The results were unexpected; we did not find any significant differences between the students with low level of resilience (median score = 10) and the group of students with average and high levels of resilience (median score = 10), though a close friend is considered to be one of the most important protective factors that social environment can offer. It is generally accepted that peers play a significant role in teenagers' lives, so we presumed that students with low level of resilience would not have schoolmates who they could share their problems with, who they could ask for help, or who they could spend their time with both inside and outside the school, and consequently they would have problems when facing adversity.

Figure 8 *Questionnaire Part 6 – I have at least one schoolmate who...*

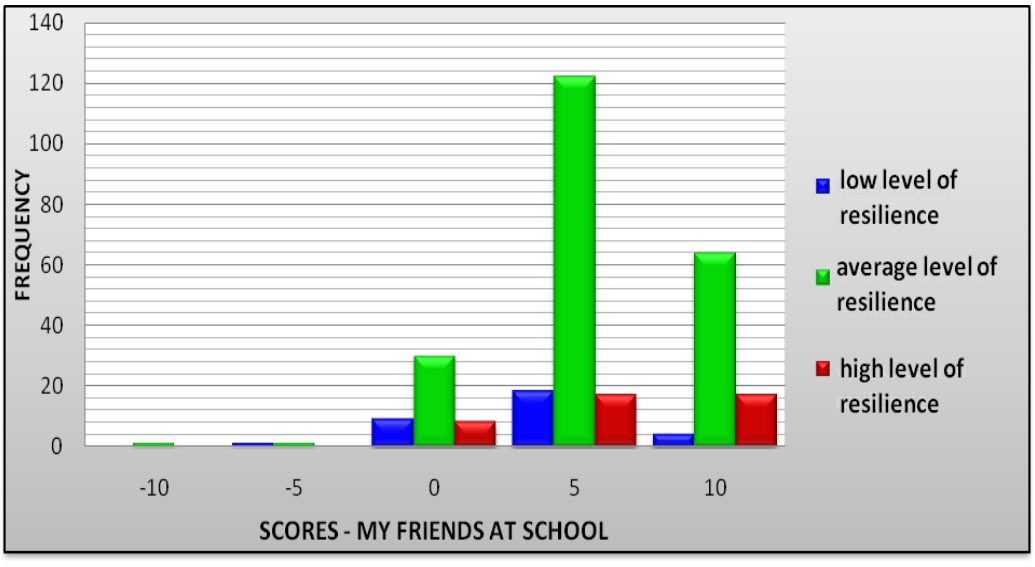


The vast majority of students (95.55%), regardless the level of their resilience, achieved a positive score. It means that they had a good relationship with at least one of their schoolmates. Based on the results of the fifth and the sixth parts of the questionnaire, we think that a friend among the schoolmates cannot be the distinguishing factor between the students with different levels of resilience in social environments with such positive relationships as we detected in all three schools participating in our research.

We have another interesting piece of information after data analysis – only the students with average and high levels of resilience achieved negative scores in this part of the questionnaire. We believe that these students have close friends from other classes or outside the school and such positive relationships partially substitute the lack of an intimate relationship in the class. Though only partially, because students spend a lot of time in school, especially in their class, and having someone who they can be with during the breaks and lunch time makes the hours spent at school more pleasant.

The last part of the questionnaire dealt with the ambitions, attitudes towards learning, and behavior problems of students' friends at school. Our objective was to find out whether the qualities of one's friends and their positive or negative influence could affect one's level of resilience.

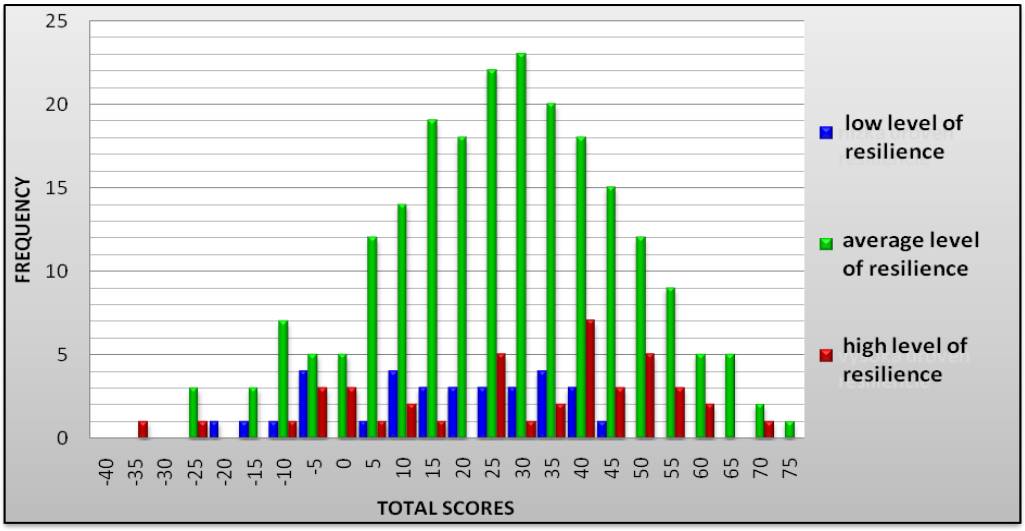
Figure 9 *Questionnaire Part 7 – My friends at school*



We found significant differences between students with low level of resilience (median score = 2) and the group of students with average and high levels of resilience (median score = 4). By confirmation of the hypothesis it was proved that peers influence each other; more students with average and high levels of resilience had as friends the ambitious, successful schoolmates who were not afraid to face challenges and solve difficult situations, achieve good educational results, recognize the value of education and their behavior is socially acceptable. We deduce that the resilient students tend to choose friends with similar personality traits and the same is applicable to less resilient students. It means that also less resilient students tend to gather and in such groups there is not much motivation to improve. This finding is very important for schools and teachers when applying group activities. They should form mixed groups of students with different levels of resilience and give students an opportunity to build friendly relationships with their schoolmates who are more ambitious.

Before questionnaire administration, we correctly presumed that secondary grammar school students would have an ambition to go to university and to find a well-paid job requiring high qualification and the scores in this part of the questionnaire would be positive. Only 12.67% of respondents achieved a negative score. We also presumed that the students with average and high levels of resilience would perceive school climate more positively than the students with low level of resilience not only in individual parts of the questionnaire but in the whole questionnaire, too. 13.36% of students achieved a negative score.

Figure 10 *Questionnaire*



Students with average and high levels of resilience (median score = 27) perceived school climate more positively than their less resilient schoolmates (median score = 17). Our findings show that there is a relationship between the student's resilience level and his/her perception of school climate, therefore schools should make an effort to make school climate as positive as possible and offer sufficient amount of protective factors to enhance the students' resilience.

If considering the parts of the questionnaire, we found a connection between students' perception of school climate and their level of resilience in the following parts: "Relationships", "School", and "My friends at school" but the results from the parts: "In this school there is at least one teacher who ...", "Our teachers ...", "My class", and "I have at least one schoolmate who ..." show that between the subjective interpretation of the quality of these factors and the students' level of resilience there is no relationship.

5 Discussion

The research sample included three secondary grammar schools: a public a private and a religious one from various regions of Slovakia. The sample was homogenous as for the educational results of schools. We would like to stress that the results of our research are not applicable to the whole population of 10^{th} and 11^{th} graders because we used convenience sampling as it was very difficult to find schools willing to take part in the research.

The most important finding is that there is a relationship between students' level of resilience and their perception of the school climate. It is the subjective interpretation of events and conditions offered by schools rather than the exposure to them that is significant because students from the same school or class experienced the same factors differently. The finding that the students with low level of resilience rated school climate more negatively than the group of students with average and high levels of resilience can be explained either by the fact that schools are not able to provide such a social environment which respects the needs of all students and offers activities attractive to everyone or by the fact that lower satisfaction with school climate is affected by a limited capacity to adjust to school environment.

The school climate and the class climate influence each other, but our results show that the subjective interpretation of class climate, but not the school climate, is not affected by a student's resilience level, and vice versa. It was an unexpected finding because we presumed that the students with low level of resilience would not be satisfied with their class environment and would indicate the occurrence of social pathology in their class.

If we compare the data from the first and the fifth part of the questionnaire we get surprising results, too. Students perceive relationships at school level more positively than at class level, though the class is a smaller social unit within a larger one that should make building intimate relationships easier. We thought that more students would have friends in their class and therefore they would feel safer there and would be more satisfied than in the large school community. From a different aspect we find interesting that lower satisfaction in the class did not affect school satisfaction.

It is generally accepted that personal and professional characteristics of teachers have a great impact on school climate, especially their ability to build close relationships with their students, the capacity to detect problems and to help solve conflicts between the students are being emphasized. The students expressed satisfaction with the work of their teachers but we did not find a link between this fact and the students' resilience.

It is well known that the character of school climate is determined by the quality of interpersonal relationships within the institution and the more positive the school environment is, the more resilient the students are. Our findings, in contrast to results of several published studies, say that there is no significant relationship between the students' resilience level and the presence or absence of an intimate relationship with either a teacher or a schoolmate, though the importance of relationships based on mutual trust cannot be questioned. It is probable that those students who do not have a close person at school build friendly relationships outside the school.

Students tend to choose friends who they share personality traits with. The results of our research confirm this assumption. It means that the resilient students' friends have positive influence on them and function as a protective factor while the students with low level of resilience are not motivated by their friends to achieve success. It leads us to the conclusion that if the students with low level of resilience had more ambitious and hardworking friends, they could achieve better results both inside and outside the school and develop a larger scale of coping strategies.

Conclusions

In general, the teachers in Slovakia are not familiar with the phenomenon of resilience so our intention was to gather information and find a connection between the resilience level of Slovak 10^{th} and 11^{th} grade students and the extent of their school satisfaction, i.e. the interpretation of the quality of school environment. Our findings show that, surprisingly, teachers whose students participated in our research applied methods fostering this competence without even knowing about it and so successfully

participated in forming a positive environment providing protective factors to their students.

Despite the difficulties we experienced when creating the research sample, we encountered great interest in our research and possible ways of enhancing students' resilience on the side of teachers. We were glad to see that teachers asked for extra copies of our research tools and intended to use them with the classes not participating in the research, too. It was not only the gathered data that served as a feedback for teachers and school managements because students were eager to express their opinions on the school climate. After the administration, students and teachers lead vivid discussions about the things that should be improved in their school environment. The main objective of this research was to study the levels of student resilience, their school satisfaction, and the extent to which school satisfaction, i.e. subjective interpretation of school climate, influenced the level of students' resilience. Not all our findings are compatible with the results of large studies but we need to consider the specifics of the research sample. We are aware of the fact that some further research must be done with the use of a random sample but despite the limits of our research, the results can serve as a basis for further work as not much has been done in the field of the resilience research in Slovakia.

References

BARNOVÁ, S. 2009. Rozvoj reziliencie v škole. In KOMÁRIK, E. (ed.) *Reziliencia a nové prístupy k výchove a vzdelávaniu.* Bratislava: Comenius University in Bratislava, Faculty of Education, 2009, p. 127.

BARNOVÁ, S. 2010. *Sociálne aspekty školy z pohľadu resiliencie* [Dissertation]. Bratislava: Comenius University in Bratislava, Faculty of Education, 2010, 246 p.

FISHER, R. 2004. *Učíme děti myslet a učit se.* Praha: Portál, 2004. 172 p.

GORDON ROUSE, K. A., LONGO, M., TRICKETT, M. *Fostering Resilience in Children* [online]. Bulletin 875-99. The Ohio State University [cit. 2011-03-10]. Available at: <http://ohioline.osu.edu/b875/index.html>.

HLÁSNA, S. 2007. Pozitívne aspekty života žiaka v triede z hľadiska kvality života žiaka. In *Výchova, škola, spoločnosť – minulosť a súčasnosť* [CD-ROM]. Bratislava: Comenius University in Bratislava, Faculty of Education, Slovak Educational Society within the Slovak Academy of Sciences, 2007, p. 253-257.

MASTEN, A. S. 1997. Resilience in Children at-Risk. In *Research/Practice Newsletter* [online], vol. 5, 1997, n. 1 [cit. 2011-03-10]. Available at: <http://cehd.umn.edu/CAREI/Reports/Rpractice/Spring97/resilience.html>.

MASTEN, A. S., COATSWORTH, J. D. 1998. The Development of Competence in Favorable and Unfavorable Environments. In *American Psychologist* [online], vol. 53, 1998, n. 2, p. 205-220. [cit. 2011-03-23]. Available at: <http://www.coe.fau.edu/faculty/gbrigman/sss_articles/Masten,%20Coatsworth%2098.pdf>.

MASTEN, A., OBRADOVIĆ, J. 2008. Disaster Preparation and Recovery: Lessons from Research on Resilience in Human Development. In *Ecology and Society* [online], vol. 13, 2008, n. 1 [cit. 2011-03-10]. Available at: <http://www.ecologyandsociety.org/vol13/iss1/art9/>.

RUSSO, R., BOMAN, P. *Primary School Teacher's Ability to Recognise Resilience in their Students* [online]. [cit. 2011-03-15]. Available at: <http://www.aare.edu.au/aer/online/0701c.pdf>.

TAMÁŠOVÁ, V. 2008. *Rodina a škola ako kriminogénny faktor.* Bratislava: Lingos, 2008. 66 p.

UNGAR, M. (ed.). 2005. *Handbook for Working With Children and Youth.* Thousand Oaks: SAGE, 2005. 511 p.

UNGAR, M. 2006. *Strength-Based Counseling.* Thousand Oaks: Corvin Press, 2006. 129 p.

WAXMAN, H., GRAY, J., PADRON, Y. 2003. *Review of Research on Educational Resilience* [online]. [cit. 2011-03-24]. Available at: <http://www.eric.ed.gov/PDFS/ED479477.pdf>.

ARTICLES

Teacher's and student's competence beliefs according to scenario theory

Michal Čerešník*

Abstract: The article is connected with the problem of personal teacher's and student's competence, resp. saturation of need for competence, which reflects our desire to sense that our activity, abilities and effort are crucial for our impression that we influence our environment, for our feeling that we are respectable people. We are interested mainly in the problem of perceived control in the context of specific scenario teacher-student.
Key words: teacher`s/student`s competence, control, scenario.

1 Scenario of a "traditional school"

The social behavior is controlled by a complex of social roles, which create the proper "I" (Goffman, 1959). This is a view of sociological tradition about people functioning in a social context. We can accept such a form of reductionism and look at the interaction teacher-student through the perspective of scenario theory. Scenario is an interpersonal and social plan which regulates our interpersonal behavior as well as the roles (as individual operational plans) regulate our individual behavior. We can meet with the scenario in various personality theories (for example the transaction analysis) though the authors do not have to designate it this way. An advantage of the scenario is a fairly easy orientation in a social context which we usually want. However, the disadvantage is a creation without assessment and too frequent application.

In the centre of our interest there is the scenario of the the "traditional school" concept teacher-student. As many other scenarios, it is based on a priori defined bilateral evaluation of cognitive disability. How is this scenario formulated? "My teacher is foolish, but he/she thinks that I am foolish." What does the scenario require from a teacher? He/she must be right. He/she perceives the student as a "subject" which is in the school because of learning. The student has to fail from time to time. Formal

* Michal Čerešník, Constantine the Philosopher University in Nitra, Faculty of Education, Department of Pedagogy and School Psychology, Slovakia; mceresnik@ukf.sk

evaluation appears from the presumption that the majority of "subjects" in the class must get worse marks besides the best marks in the class. The scenario is thus reinforced in this way.

What is the scenario based on? M. Moldoveanu and E. Langer (2004) write about seven principles of the scenario:

1. Basic has to be learned so that it can become natural.
2. To be concerned means that we are focused on one thing only.
3. It is important to delay the need satisfaction.
4. The mechanical memorizing is unavoidable in education.
5. Forgetting is a problem.
6. If we are intelligent we have to know what happens around us.
7. Each answer can be evaluated as right or wrong.

Principles defined in this way have clear consequences for the expected behavior of a student which does not have to be concentrated on information acquisition but on making a good impression to a teacher. Students create the set-off strategies and they believe the teacher does not reveal them. Students try to fill the principles of the teacher's scenario:

1. I do not discredit the basic assumptions of arguments because the teacher will hate me for it.
2. I pretend that I am concerned with the task. I hide my interests.
3. I pretend that I am responsible and I concerned with education.
4. I reproduce the teacher's words exactly.
5. I use a lofty style of speech to make a good impression at teacher.
6. I pretend that I am informed. I use samples from media, work, family, etc.
7. When I am admired, I smile. When I am being lectured, I express the regret, I discredit myself and apologize.

The conclusion of such interaction is a reinforced spiral of acts which keep both parts of the system together. In the introduction to his book, E. Goffman (1959, p. 1) writes that if the man comes close to other people, they will seek for information and "will be interested his general socio-economic status, his conception of himself, his attitude towards them, his competence, his trustworthiness, etc." People seek for a lot of information about other people they are in interaction with and they consider the information relevant. E. Goffman`s (1959) description of making an impression corresponds to the competence evaluation.

2 The need for competence

We can describe the competence, or the need for competence, as a wish to perceive ourselves as capable to produce desired outcomes and to avoid undesired outcomes. The need for competence is considered for an inborn and universal part of human nature (White, 1959; DeCharms, 1968; Deci, 1975; Harter, 1978; Koester – McClelland, 1990; Connell – Wellborn, 1991) and it supports an affirmation that the human beings have the inner motivation to influence the environment. However, the thesis contains two problem parts.

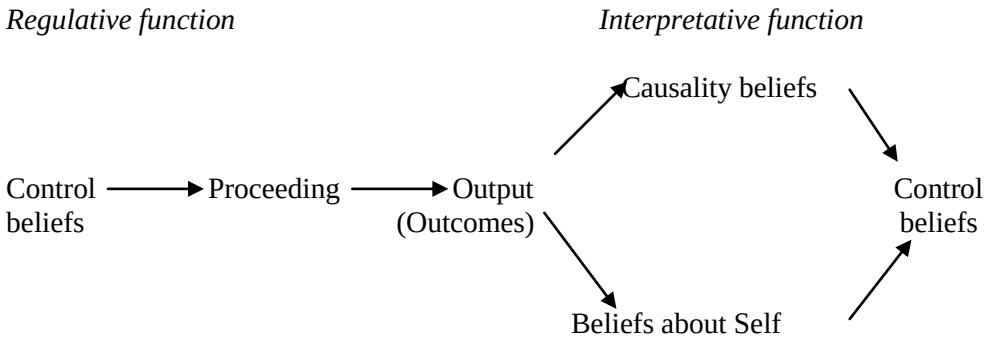
The main part is the replacement of the need for competence and the need for self-determination (or autonomy). E. A. Skinner (1995) stated that the competence pertains to the relation between the behavior and its outcomes. The statement is based on the research of R. DeCharms (1968; 1981), E. L. Deci (1975) and E. L. Deci and R. M. Ryan (1985). E. A. Skinner (1995) writes that the competence is an extent to which a man can produce desired events and prevent undesired events. The opposite of the competence is helplessness. The autonomy pertains to the relation between the will and the proceeding. It is an extent to which a man can feel free to behave in the way he/she chooses. The non-autonomous behavior includes compliance and defiance which are the reactions on the others` proceeding and are not chosen willingly.

The second problem part is the question whether the need for competence is inborn or acquired. The theories of social learning do not agree with the assumption of the need for competence universality. They assume that the perceived control is a cognitive residue of reinforcement history. The theories of acquired needs assume that the needs are products of socialization. It means that the source of motivation is localized externally in these theories. E. A. Skinner (1995) argues that the growth of the need is based on socialization history and therefore the relation between the history and the size of the need is linear. But the argument of the need innateness is also discredited by individual, ontogenetic and cultural differences among people. Nevertheless, the belief in universality and innateness of the need for competence is a very optimistic theory. It emphasizes the inner motivation of behavior. But we should accept the limitations of a social context which gives a man the opportunity to be competent.

3 Control beliefs

In spite of many questions about contamination of the need for competence with autonomy and about the innateness of the need, undoubtedly everybody wants to be competent, or to control the system of competence. The system contains control beliefs which have regulative and interpretative functions. It means that the system regulates the quality of proceeding and interprets the output when the activity ends. It has a cyclic character (Figure 1) which emphasizes the dynamics of the control construct, possibility of change, situational-historical determination of the need for competence and the work with information affecting a man, or the necessity of their structuring.

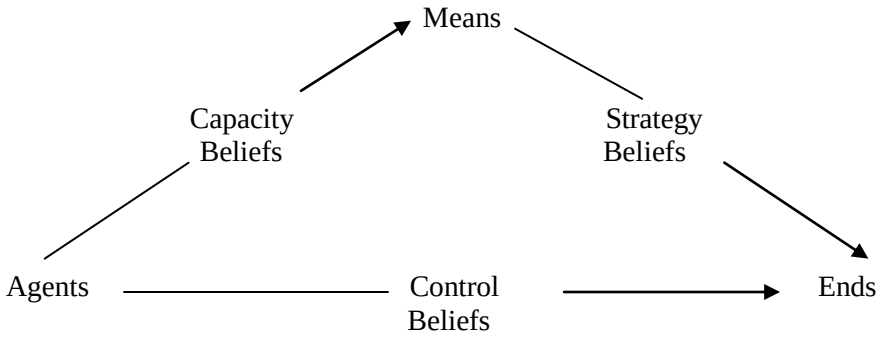
Figure 1 *System of competence*



The author of this theory is E. A. Skinner (1995). She named this construct a perceived control. Her theory issues from the theory of proceeding which considers the proceeding a central unit of behavior analysis (Boesch, 1976; Frese – Sabini, 1985). The proceeding is defined as a goal-oriented, intentional, emotionally under-painted behavior which is enacted in social context. In the course of conceptualization of the perceived control, E. A. Skinner (1995) distinguished three theoretical components of proceeding: agents, means and ends (Figure 2). It implicates three types of believes within the system of control. First, control beliefs pertain to generalized expectations about the extent in which the Self can produce desired and to prevent undesired events. Second, strategy beliefs pertain to generalized expectations about the extent in which some means or causes are adequate conditions for production of ends or outcomes. Third, capacity beliefs pertain to generalized expectations about the extent in which the Self manages or has an access to some means.

Obviously, E. A. Skinner (1995) operates with the concept "belief". Belief marks the essence of the perceived control. It is a cognitive construction which is open to change. It pertains to future (in terms of expectations) or to past (in terms of attributions). E.A. Skinner (1995) expects that the functions of beliefs are regulation and interpretation of proceeding (as shown in Figure 1).

Figure 2 *Three types of believes*



Regulative beliefs are control beliefs (I have control, I am competent) and interpretative beliefs are capacity beliefs (I have a feature required for my success) and strategy beliefs (I can apply a feature required for my success). E. A. Skinner (1995) regards these types of beliefs as separated cognitive constructions. From the semantic perspective it is possible to regard the control beliefs as combination of capacity and strategy beliefs. Thus if anyone is able to apply effective strategy then he/she has control.

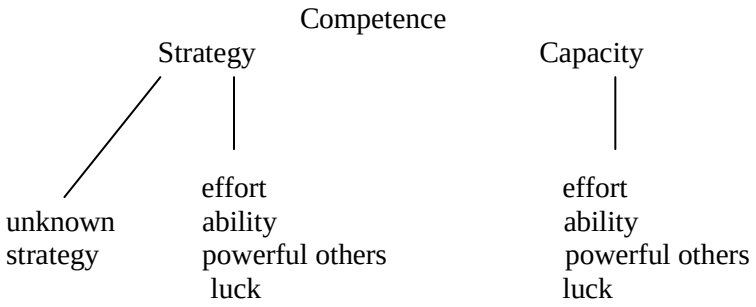
4 Control profiles

We can use information about the beliefs for the construction of control profiles. We distinguish optimal and non-optimal control profiles. First, we should complete the capacity and strategy beliefs with typical attributes according to E. A. Skinner (1995) who accepts the ideas of H. Levenson (1982) and H. M. Lefcourt (1973) (the authors of "Locus of control" theories) and works with the following attributes. The capacity beliefs include the effort, ability, powerful others and luck. Within the strategy beliefs there are the effort, ability, powerful others, luck and unknown strategy (Figure 3).

The optimal control profiles contain:

- high control beliefs (I can be successful and I can avoid a failure);
- high strategy beliefs and high capacity beliefs in an effort (effort is an effective agent and I can try);
- low strategy beliefs and high capacity beliefs in ability (ability is not crucial but I am clever);
- low strategy beliefs and high capacity beliefs in powerful others (teachers manage me but I can force them to like me);
- low strategy beliefs and high capacity beliefs in luck (luck is not the main assumption of success but I am lucky);
- low strategy beliefs in the unknown strategy (I know the causes of success and failure).

Figure 3 *Attributes of the perceived control*



Non-optimal control profiles contain:

- low control beliefs (I cannot be successful and I cannot avoid the failure);
- high strategy beliefs and low capacity beliefs in effort (effort is an effective agent and I cannot try);
- high strategy beliefs and low capacity beliefs in ability (ability is crucial but I am not clever);
- high strategy beliefs and low capacity beliefs in powerful others (teachers manage the activity in class but I cannot force them to like me);
- high strategy beliefs and low capacity beliefs in luck (luck is the main assumption of success but I am not lucky);
- high strategy beliefs in the unknown strategy (I do not know the causes of success and failure).

5 Student's control in educational environment

What are the implications of such information? Students are not free in traditional system of education because they are comfortable, non-autonomous, and they react purposely on the proceeding of the others. However, students are competent because they modify their own behavior to produce desired outcomes – success in school. Their strategy belief (when I play an expected role within the scenario teacher-student I will be successful) is enough for their subjective impression about their own competence. But this kind of saturation of the need for competence, hopefully, is not the goal.

What do we suggest as an alternative to the scenario of "traditional school"? We suggest cancelling the pessimistic impression of humans controlled by "egoistic genes" and "social engineering". People are also confirmed in education, and in the mechanism of social reproduction (Komárik, 2001). E. Komárik (2001) says that education is not the right (student cannot decide if he/she uses it or not). It is a coercive instrument based on asymmetric relation (between an educator and an educated). Such a relation directs the young man to the constitution of interpersonal relations (in terms of the concept "paidagogia"), escorts him from unconsciousness, and directs him to culture (in terms of the concept "educatio"). E. Komárik (2001) draws the attention to the symmetrical relation which can be attained in the process of personal maturity in the contact with the ideal and common influence of the others. E. Komárik (2001) calls this process "edification".

6 Change of the "traditional school" scenario

What does it all mean for the scenario teacher-student? Unfortunately, scenarios cannot be eliminated because they come under the cognitive structure which reflects our experience and helps us to be orientated in social situations, though it is possible to modify the scenarios. According to the assumptions of M. Moldoveanu and E. Langer (2004) we propose the modification:

1. The basis can be perceived as a condition for functioning in psychologically valued relations. They can be natural for man.
2. Concentration on one thing can be requested. But in many situations the diffusion of attention is more desirable.
3. The delay of the need satisfaction is necessary for long-term goals satisfaction. But sometimes it is possible to satisfy the needs immediately.
4. Memorizing seems to be useful sometimes. If we can apply it in natural activity, it does not function as pressure.

5. Forgetting can be a problem. Especially we cannot remember the sources we can get the information from.
6. Application of information to common life and gestalt perception is requested. But we cannot perceive everything.
7. The answers on questions can be either right or wrong. But in many situations it is possible to respond the questions by several right answers.

If we will are successful in the system application of such a new scenario, we can overcome bilateral derogative content of the scenario teacher-student: "My teacher is foolish, but he/she thinks that I am foolish." If we, as the teachers, are competent to change this scenario, students are competent too. They can also change the principles of scenario which can looks like this:

1. I can have doubts about basic arguments. We will try to find the truth together with the teacher.
2. I am concentrated on my interests. I am concentrated on work.
3. I choose the activities I am involved in. I am responsible.
4. I can choose my own communication style which respects the others.
5. I do not have to make a good impression at teacher. He/she evaluates me according to my knowledge. He/she respects my personality.
6. I am informed. I try to comprehend the information systematically.
7. I enjoy when I am successful. When I am not doing right, I try to improve my performance.

Such a concept may seem too idealistic, but the ideals are our goals and we should try to bring them to life.

References

BOESCH, E. E. 1976. *Psychopathologie des alltags*. Bern: Huber, 1976. 525 p.

CONNELL, J. P., WELLBORN, J. G. 1991. Competence, autonomy and relatedness: A motivational analysis of self-system processes. In GUNNAR, M., SROUFE, A. (eds.) *Minnesota Symposium on Child Psychology*. Chicago: University of Chicago Press, 1991, p. 43-77.

DECHARMS, R. 1968. *Personal causation*. New York: Academic Press, 1968. 398 p.

DECHARMS, R. 1981. Personal causation and locus of control: Two different traditions and two uncorrelated constructs. In LEFCOURT, H. M. (ed.) *Research with the locus of control constructs: Vol. 1 Assessment and methods*. San Diego: Academic Press, 1981, p. 337-358.

DECI, E. L. 1975. *Intrinsic motivation*. New York: Plenum, 1975. 324 p.

DECI, E. L., RYAN, R. M. 1985. *Intrinsic motivation and self-determination in human behavior*. New York: Plenum, 1985. 332 p.

FRESE, M., SABINI, J. (eds.) 1985. *Goal-directed behavior: The concept of action in psychology*. Hillsdale: Lawrence Erlbaum, 1985. 440 p.

GOFFMAN, E. 1959. *The presentation of self in everyday life*. New York: Doubleday Anchor Books, 1959. 260 p.

HARTER, S. 1978. Effectance motivation reconsidered: Toward a development model. In *Human Development*, vol. 21, 1978, n. 1, p. 36-64.

KOESTER, R., MCCLELLAND, D. C. 1990. Perspectives on competence motivation. In PERVIN, L. A. (ed.) *Handbook of personality: Theory and research.* New York: Guilford, 1990, p. 527-548.

KOMÁRIK, E. 2001. K vymedzeniu pojmu edifikácia v kontexte sociálnej pedagogiky. In PETLÁK, E. (ed.) *Premeny slovenského školstva na prahu nového milénia.* Nitra: PF UKF, 2001, p. 182-191.

LEFCOURT, H. M. 1982. *Locus of control: Current trends in theory and research*. New York: John Wiley, 1982. 288 p.

LEVENSON, H. 1973. Perceived parental antecedents of internal, powerful others, and chance locus of control orientations. In *Developmental psychology*, vol. 9, 1973, n. 2, p. 260-265.

MOLDOVEANU, M., LANGER, E. 2004. Keď je „hlupák" bystrejší. Hlúpi sú tí druhí. In STERNBERG, R. (ed.) *Prečo robia múdri ľudia hlúposti.* Bratislava: Ikar, 2004, p. 247-268.

SKINNER, E. A. 1995. *Perceived control, motivation and coping*. Thousand Oaks: Sage Publications, 1995. 232 p.

WHITE, R. W. 1959. Motivation reconsidered: The concept of competence. In *Psychological review*, vol. 55, 1959, n. 5, p. 297-333.

Acta Technologica Dubnicae
volume 1, 2011, issue 1

Measuring of educational service quality (focused on universities)

Ján Kamoďa*

Abstract: This paper deals with common problems in the process of education at the university level. It focuses on the quality of education process. The aim of this paper is to determine the principal criteria of the quality measurement of the education service.

Key words: education, quality of education, education process, educational service, quality measuring.

Quality of education

What should be the quality of education like? Unfortunately, nobody knows and nobody tries to find out a current, objective, reliable and actual picture of the education system, the aspects that affect the quality of tuition and education process, or the typical features of a high quality educator, school, faculty etc. If you ask up to 20 people to define the term: "the quality in relation to a faculty", you would most probably receive 20 more or less different answers. Such term has a different meaning for a student, a lecturer, a university graduate, a parent, but also for the government or the parliament.

1.1 Determination of the term: quality of education process

Generally, we can say that the following features characterize the education process:

a) Quality as perfection – it is the traditional approach to assess quality with the aim to become the best:
   - direct: individually (a student)
   - indirect: mediated (by the educational process)

b) Quality as faultlessness.

c) Quality as a capability of purpose – we view education as a utility value, the ability to implement it in life.

* Ján Kamoďa, Dubnica Technological Institute, Dubnica nad Váhom, Slovakia; jankamoda@gmail.com

d) Quality as a readiness and ability to complete tasks and reach the goals – executing the mission and orientation of the faculty, meeting the requirements coming from the processes of evaluation and accreditation.
e) Quality as an ability to satisfy a customer – a student.
f) Quality as a financial success – granting the funds only to school that is of a high quality; not to consider the school with enough finances to be of high quality.
g) Quality as a threshold (level) – it is important to be familiar with the levels of lower or higher quality. Therefore, there are set up the "standards of education, criteria, and pedagogical directives."

1.2 Quality of education – quality of the university

Universities can be taken as business firms with highly complex and professional offers and fields of activities where we can talk about some principles and goals that confirm their complexity. The dominant characteristics are:

- Freedom of educational policy and research.
- Linking the educational policy and the research.
- Openness for a number of diverse scientific opinions.
- Co-partnership of lecturers and undergraduates.
- Autonomy of the university.

The study at a tertiary level should correspond with the following principles:

- Professional training. When starting a job the graduate should be able to accomplish her/his work duties according to research progress.
- Educational process.
- Subsequent education of university graduates.

As it has been mentioned above the management of the university quality should be focused on education and subsequent education process, science, research, and finally, on the control and organization of the university itself.

2 Measuring and assessing the education process quality

2.1 Why should we measure?

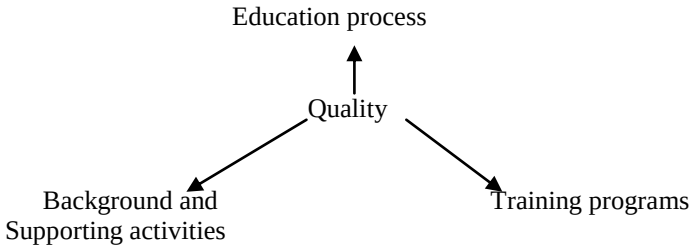
There are plenty of reasons why it is necessary to implement the system of quality measurement at the universities, and here we offer some of them. The system of quality should be used, predominantly:

a) for the internal purposes of the faculty;
b) for the pedagogical staff;
c) for improvement of the education process;
d) as the essential material for external inspections;
e) as the basic material for certification;
f) for the use of comparison;
g) for the faculty management;
h) for providing the society with transparent information;
i) for the faculty's human resources management;
j) for achievement, keeping and improving the quality itself.

2.2 What should we measure?

We can start with the following model of the quality of education process at a faculty:

Figure 1 *Model of the Quality of Education Process*



a) *Background and supporting activities*
- structure of lectures and lecturer's skills;
- material, technical, financial, information background (literature availability, the equipment and the services of study room, library, computer net services…);
- research activities and their connection with the education process;
- feedback of the practice;
- inter-faculty cooperation;

b) *Training programs*
- profiles, cooperation with the job market (It is not only the point if a graduate is employed, but if s/he works in her/his field of profession, specialization, a degree s/he was awarded, if s/he works in a leading position or not…);
- structure and creation of training programs;
- structure and creation of subjects;
- education system, the load of undergraduates;
- flexibility;

c) *Education process*
- participants of the education process;

2.3 How should we measure?

A lot of methodologies providing the evaluation of the education process have been already created. The most widely applied one has been the application of measurable quality indicators and the method of the faculty's virtues and weaknesses analysis, either from the position of a subject, an object or an indirect participant of the educational process. However, none of them does provide a complete picture – the complex information. This can be achieved only by a simultaneous application of both methods. Nowadays, there exists a tendency to move the quality assessment more to the input area, since the output area criterion seems not satisfactory. It should be rather a system that motivates people to think more about themselves, their behavior and the consequences than the system limited to external check out and inspection. It should be the system in which both items – internal self assessment and external examination would be balanced and interconnected (Appendix A).

2.3.1 Self assessment

For implementing the self assessment process it is necessary for the faculty to be permanently interested in quality. The purpose is not only to acquire a review of the current situation, but also to create the set of measures, how to keep the achieved level of quality, how to improve it continuously and in the same time how to execute and bring the measures into effect.

The main objectives of the self assessing process are three consequent functions:

1) To stimulate internal quality management and create adequate conditions for it.
2) To prepare the faculty for the external evaluation.
3) To provide the latest information about the faculty's situation for external assessors.

Procedure of self assessment

- purpose identification;
- process planning;
- data collection;
- classification, analysis, survey;
- elaborating a report;
- expectation of initial situation improvement;
- monitoring.

2.3.2 External examination

The principal body here is the evaluating committee – a group of independent external experts appointed by an accreditation committee. The external examination is based on two kinds of information about the faculty:

a) the self-assessing report elaborated by the faculty;
b) the survey made at the faculty.

The committee fulfills two tasks:

A) assessment-advisory
- evaluation of the faculty via quality audit;
- carrying out a written notice with a set of recommendations and suggestions for improvement of the current situation;

B) information-advisory
- arrangement of information about the evaluated faculty;
- setting up the recommendations and suggestions for further steps of supervisory bodies;

The results thus represent the initial information for the accreditation committee.

3 The analysis of faculties' assessment criteria at the university level

The accreditation committee usually determines within the scope of its activities the following criteria:

1) The number of staff in the pedagogical process:
   a) The full-time employees:
      - professors,
      - senior lecturers,
      - lecturers,
      - assistant lecturers,

- scientific personnel;

b) The part-time employees:
- professors,
- senior lecturers,
- the other employees;

2) Pedagogical process:
a) the total number of undergraduates and postgraduates and the length of a course;
b) the work load of the employees;
3) Scientific and pedagogical qualifications (number of degrees – habilitations and inauguration);
4) Publications of original research;
5) Number of citations;
6) Inventions, discoveries and awarded prizes;
7) The implementation of artistic activities and the research in practice;
8) Allocated grants;
9) Membership in international boards and panels;
10) Membership in national professional and scientific institutions;
11) Finances;
12) The evaluation of the quality of education process:
a) the input profile of an applicant;
b) total and relative number of students;
c) number of students in the grades;
d) the graduates' position in the job market.

Are such criteria really objective enough to obtain a reliable image of a faculty's quality in comparison with other faculties?

The ratio of professors, senior lecturers and other pedagogical staff, and the total number of pedagogical workers

The quality of school is often rated through the number of pedagogical staff employed, as the higher is the number of teachers with academic degrees, the higher is considered the quality of school. But is the quality of accomplished work (the quality of lectures, seminars, workshops…), the ability to attract and motivate students, to apply new achievements, and the ability to present them to students the true reflection of a lecturer's acquired degree?

Number of citations

However, this criterion seems to contribute to the decision making about quality of education process, there arises another question again: "Can we consider it really

objective, or is it only a part of mutual 'cooperation' of departments, faculties, universities in quoting each other?"

The graduates' position in the job market
It is understandable that a successful graduate can reflect the faculty's quality, moreover, she/he can have more advantageous position in the job market, but the point is: "Are these aspects really so dominant and crucial in the society? Can job vacancies in the graduate's job market, or if her/his relatives or backing recommendations play a bigger role for getting a job? Or shall we consider good luck and coincidence more than the achieved level of education?"
However, to find the answer to such questions is not difficult. But there is still a question of applying these aspects in the evaluation process of faculty's (school's) quality. Though we have discussed some criteria of the government accreditation boards, we consider their evaluation to be the most vital motivation incentive for retaining the quality of the faculty with the purpose of increasing the effectivity of the quality evaluation. Here are some other ideas to be considered:

1) Creating, establishing a new branch of study (specialization, the change of content of tuition and education policy), merging or splitting the branches (specializations).
2) Cooperation with graduates, contacts, get-together-gatherings, controlling/managing scientific workshops with the graduates.
3) Activities on demand of the supreme organs of executive administration, government agency (elaboration of technical expertise, reviews, suggestions….).
4) Considering the criteria that play role for a student when taking up a university (field of study, specialization).

4 Questionnaire

The level of quality is determined by a customer, and a customer is anybody who is being provided some service and the service should be provided on the highest possible level. In our situation a student is a customer, and that is why, she/he has the right to get the highest possible quality of service, which means the best quality education.

The priority of each school should be to know students' expectations, their needs and wishes on the base of reliable sources, but not only via teachers' intuition and experience. All this requires subsequent feedback – surveying the students' attitude to the education process and the school itself, and doing a regular market research. A

questionnaire method is suitable for such feedback. We applied the method with the purpose to acquire our students' opinions and ideas of the quality of education process (Appendix A).

Evaluation of the questionnaire (Appendix A)

1. Why did you choose this faculty?

The highest percentage of the asked respondents decided for the answer b) "I considered this faculty to be the best." This choice reveals the students' belief that they have chosen the best quality.

2. Does your study at this faculty meet your expectations?

In this case we could not expect 100 % score, as not all respondents may have passed through all lectures, seminars, so they could not express their opinions.

3. Would you like to have more practical workshops than theoretical lectures included in your study?

The students gave a positive answer, as the professional training from their point of view is not sufficient. A student has not a chance (maybe only a minimal one) to apply her/his theoretical knowledge in practice.

4. Are you satisfied with the methods and quality of lecturers?

Despite the fact that positive answers prevailed, we could often meet with the remarks about missing practical examples in the education process. The ideal situation could be achieved only if there is applied a quality credit system at the faculty that would enable students to choose the lecturers of subjects.

5. Are you satisfied with the content of lectures and seminars?

The most respondents again answered "Yes" – 80 % score. Probably because not all lecture rooms are equipped with quality didactic technology.

6. Do you consider the system of examination rating fair?

Here the students expressed their disagreement and came up with some sharp critical remarks. The students pointed out at these factors:

- Subjectivity of evaluation from the side of a teacher. Students bear all risks of teacher's current mood.
- Subjective opinion of an examiner, the oral exam is sometimes only a 'lottery', the written exam depends on a person who makes the tasks and who rates them.
- The absence of a lay examiner (assistant).
- Not clear credit system.
- The examiner demands her/his own opinions and examples a student was not presented within the course.
- Sometimes, sitting for an examination is a thoughtless memorizing drill.

7. Is a student competent to change the training program?

The answers confirmed our assumptions. There appeared again the bound with a credit system. If there was a well organized system at the faculty, we could expect the answer "Yes". Therefore, it is advisable to introduce a new conception of credit system so that the students have a chance to react on some conceptual issues concerning the faculty's activities.

8. If you had a chance to take up the field of study/specialization again, how would you decide now?

Despite some students' critical remarks to some issues, majority of them would not change their specialization which means they are satisfied with their choice.

9. Are you convinced that the knowledge and experience obtained at the faculty will make you more successful in the job market?

Only half of the students are sure that the knowledge and experience obtained at the faculty will make their application in the job market easier. A student is usually not supplied with much practical experience during her/his course or professional training. By means of the questionnaire we tried to reveal virtues and weaknesses of our faculty and to point at 'the gaps' that our faculty should deal with in the near future (for example, the change of the education system at universities through high quality and in life successfully operating credit system, more thorough preparations of lessons and workshops, reinforcing practical experience and skills …).

Conclusions

The purpose of the report was to offer a view on the problem of determining the quality of education process, its measuring and evaluation. This work is based, mainly,

on theoretical knowledge and data obtained. While handling with the problem we used information obtained from discussions with teachers of the tested faculty, further we used the observation method, we studied the documents (official written documents, book publications, professional periodicals). To sum up the materials we created tables and models. The other testing technique was the questionnaire.

APPENDIX A Questionnaire

1. Why did you choose this faculty?
   a) I had a lot of information about the school: 25.76 %
   b) I considered it to be the best: 31.82 %
   c) Good reputation of the faculty: 18.18 %
   d) Attractive specializations: 10.61 %
   e) Good recommendations: 13.64 %

2. Does your study at this faculty meet your expectations?
   Yes: 53.33 % No: 10 % I don't know: 0 %

3. Would you like to have more practical workshops than theoretical lectures included in your study?
   Yes: 86.6 % No: 13.33 %

4. Are you satisfied with the methods and quality of lecturers?
   a) Yes, the lecturing is OK for me: 7.5 %
   b) Yes, but there is the lack of:
      - computer technology: 13.75 % - **examples from practice: 53.75 %**
      - visual aids: 20 % - others: 1.25 %
   c) No, the method of lecturing is not OK for me at all: 3.75 %

5. Are you satisfied with the content of lectures and seminars?
   Yes: 46.67 % No: 8.33 %

6. Do you consider the system of examination rating fair?
   Yes: 36.67% **No: 63.33%**

7. Is a student competent to change the training program?
   Yes: 6.67 % **No: 51.67 %** Partially: 28.33 % I don't know: 13.33 %

8. If you had a chance to take up the field of study/specialization again, how would you decide now?

a) I would choose the same specialization at the same university: 56.67 %
b) I would choose the same specialization at another university: 8.33 %
c) I would choose completely different specialization: 33.33 %
d) I would not study: 1.67 %

9. Are you convinced that the knowledge and experience obtained at the faculty will make you more successful in the job market?

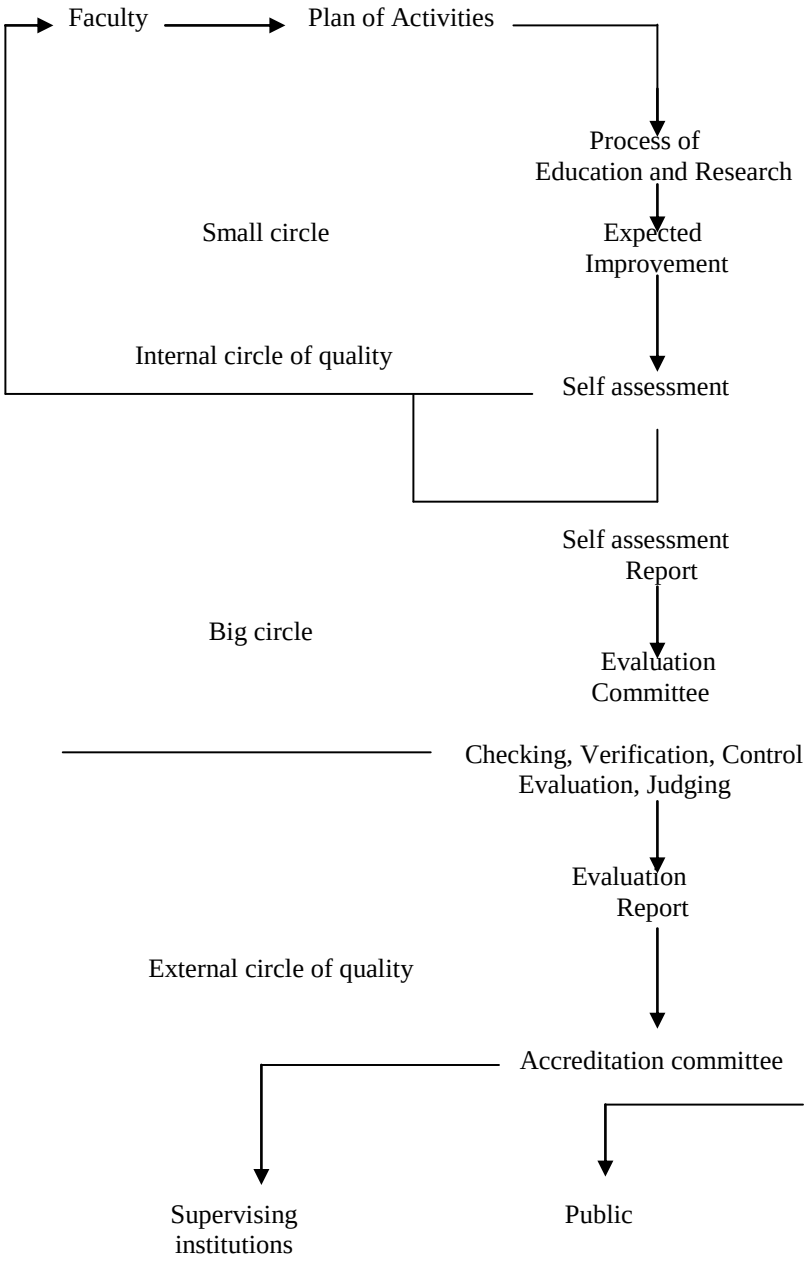
Yes: 50 % No: 23.33 % I don't know: 26.67 %

Sample of Respondents

FACULTY:	**GRADE:**	**AGE:**	**SEX:**
			male: 13.33 %
			female: 86.67 %
FOES: 36.66 %	I) 48.33 %	18: 8.33 %	
FOM: 36.67 %	II) 3.33 %	19: 33.33 %	
FOT: 26.67 %	III) 15 %	20: 11.67 %	
	IV) 30.5 %	21: 23.33 %	
	V) 3.33 %	22: 15%	
		23: 8.33 %	

Explanation of abbreviations: Faculty of Economics and Science – **FOES**, Faculty of Management – **FOM**, Faculty of Tourism – **FOT**

Figure 2 *The Basic Model of Quality System at a Faculty*



References

BENČO, J., KAMOĎA, J., HRONEC, Š., SLAČKA,S. 2005. *Ekonomika a manažment vzdelávania.* Banská Bystrica: Univerzita Mateja Bela, 2005. 300 p.

BENČO, J., KAMOĎA, J.,VEVERKA, L. J. 1998. *Základy manažmentu vzdelávania.* Čadca: TYPO, 1998. 121 p.

BENČO, J., KAMOĎA, J., NEMEC, J. 2001. *Kontrola vo verejnom sektore.* Banská Bystrica: Univerzita Mateja Bela, 2001. 108 p.

BENČO, J., KAMOĎA, J., MEČIAR, I. 2004. *Verejné služby.* Prievidza: ALFA print, 2004. 205 p.

DROPPA, M., JANOVJAK, S. A., JANOVJAK, A. Š. 2007. *Príručka pre EU-manažéra.* Bratislava: LÚČ, 2007. 289 p.

OBDRŽÁLEK, Z. 1994. *Škola, školský system, ich organizácia a riadenie.* Bratislava: Univerzita Komenského, 1994. 200 p.

ZELINA, M. 1996. *Modely riadenia školy.* Bratislava: Metodické centrum, 1996. 27 p.

Acta Technologica Dubnicae
volume 1, 2011, issue 1

Investigating the English Language Needs of Students at the University of Zilina

Dana Lengyelfalusyová – Michaela Bakay Záhorská*

Abstract: This paper focuses on investigating the needs of students of ESP courses at the University of Zilina via needs analysis questionnaire. The results of the research reveal the necessity to reconsider the content of the study material at language courses at the university to satisfy the students' subject needs as well as the needs of the international job market by implementing activities enhancing the communicative competence in ESP.

Key words: needs analysis questionnaire, ESP courses, the communicative competence.

A needs analysis plays an important role in any course design, whether for ESP or any kind of language course. It is believed that to ensure successful teaching outcome, it is essential to involve the needs and goals of both teacher and student for mutual benefits of both parties. Ignoring the learners' needs, the effectiveness of the course is being diminished. At the university the teaching curriculum is established more on what the students need to learn rather than on what they wish to learn (learners' view of learning). In the Songhori's work (2008, p. 12) on needs analysis, he quotes R. L. Allwright who makes a distinction between needs, those which students believe to be relevant to themselves and those a student puts high priority on in a given time, and lacks as the difference between the students present competence and desired one. Apart from Strategy analysis, it is important to implement all the skills and systems of English in the teaching/learning process.

We believe that except the above mentioned, the ESP course should focus on the development of the communicative competence in all its sub-competences, including linguistic, pragmatic/sociolinguistic, strategic and discourse competence (Gondová – Šipošová, 2010, p. 35). Linguistic competence demonstrates knowledge of the

* Dana Lengyelfalusyová, Faculty of Humanities, University of Žilina, Slovakia; dana.lengyelfalusyova@fpv.uniza.k
Michaela Bakay Záhorská, Institute of Foreign Languages, University of Žilina, Slovakia; michaela.zahorska@fpv.uniza.sk

The research reported herein was performed pursuant to the project KEGA n. 085ŽU-4/2011 of the Ministry of Education, Science, Research and Sport of the Slovak Republic.

language. Pragmatic (sociolinguistic) competence is the ability to perform a particular function or express an intention clearly. Discourse competence demonstrates the ability to understand coherent written texts or conversation and to produce them. Strategic competence is the ability of the speaker to use both verbal and nonverbal communication strategies which enable speakers to handle the breakdowns in communication and their lexico-grammatical inadequacies (Gondová – Šipošová, 2010, p. 35). All of the former facts should be taken into consideration when choosing or preparing materials for a classroom use.

We believe that the increasing necessity of the communication in English within the work process has changed the university students' needs and wants targeted on the demands of the work process. If so, these changes need to be done in designing the teaching curriculum of the foreign language courses at the university which has eventually become the idea of the presented research findings generally known as needs analysis questionnaire.

1 Current situation

The main objective of the English language courses of the technical study programs at the University of Zilina is to develop and expand vocabulary within the technical context supported by the development of reading and writing skills. The course includes translations of texts on technical topics as well. Our experience shows that this conception is not effective and we often have to face the discrepancy between the objectives of the course and students' expectations and wants. The expansion of the vocabulary range does not ensure the success in communication at a workplace. Therefore, it is important to implement all the skills and systems of the English language in the teaching/learning process of technically-oriented or management-oriented students as mentioned in the introduction. At present, various materials and communication techniques serving the purposes of communicative learning are available. However, our students do not get in touch with them in the classroom management process because they are overloaded with the materials containing technical vocabulary for memorization and texts for translation. Some of the courses have already been "modernized" by incorporating course books that enhance speaking and communication. Currently, there are the attempts to adapt the out-of-date materials so that they satisfy the above mentioned desires for communication.

2 The objectives of the questionnaire

Having followed the theory about the strategy needs analysis and the development of the communicative competence, we have conducted the research to find out to what

extent the English language courses satisfy the needs of students of technical and management programs at the University of Zilina, that would provide us with the information about the necessary changes within the curriculum to be taken. The data for the research were collected via a subject needs analysis questionnaire distributed to 561 students from all the faculties of the University of Zilina at the end of the summer term in the academic year of 2009/2010. In this paper, only the responses of students in technical and management programs have been taken into consideration. The evaluation was carried out on the basis of responses of 506 students, out of which 261 represent the undergraduates of the management-oriented bachelor study programs and 245 undergraduates of technically-oriented bachelor study programs.

We compiled the information from the targeted technically-oriented undergraduates of the faculties listed below:

- Faculty of Civil Engineering;
- Faculty of Mechanical Engineering;
- Faculty of Electrical Engineering;
- Faculty of Management Science and Informatics;
- Faculty of Operation and Economics of Transport and Communications (Railway Transport, Waterway transport, Road and Urban Transport, Air Transport, Postal Services).

From the management-oriented fields, undergraduates of the following faculties were involved:

- Faculty of Special Engineering
  (Security Management, Crisis Management);
- Faculty of Operation and Economics of Transport and Communications
  (E-commerce, Business Economics and Management).

The questionnaire consisted of 11 multiple choice questions with the intention to find the areas of language students feel they have problems with (skills and systems), then to draw out any kinds of activities they neglect most in lessons or of which they would like to implement more. Additionally, students were provided a choice of future applications of the English language to choose from formulated in target-orientated statements such as what areas of their work would require the use of English language knowledge and skills or whether students are satisfied with the number of English lessons per week. To ensure that no other needs relevant to the respondents were left out an open question asking for any suggestions or recommendations for changes in the English language courses was included at the end.

3 The hypotheses

Prior to conducting the research, our hypothesis had been formulated as follows.

1. As far as language skills are concerned, we presume that students will mostly report the greatest problems with speaking followed by listening.
2. We expect that students will place grammar as the most problematic one out of systems.
3. We suppose students will realize the necessity of the English language for their future employment.
4. We strongly believe that students will state the application of their language skills mostly in oral communication with customers and business management, in business negotiations and in everyday communication.
5. We suppose that most students wish to increase the amount of speaking activities of various kinds, such as conversations with the focus on professional vocabulary practice for the needs of future professions or conversations on general vocabulary practice.
6. We expect the students' satisfaction with the number of English language lessons per week.

4 Research findings

After the analysis of the answers from the questionnaire, the overall results of all the respondents as a group who represent the greatest problems with English language skills are presented first, followed by the results for two subgroups representing the management-oriented students and the students of technical courses as displayed in Table 1. The contents of the questionnaire and the results are as follows:

Question 1
From the following English language skills, I have the greatest problem with

a. writing
b. reading
c. listening
d. speaking

From the statistical results it is seen that 47.8 % of all students report speaking as the skill that causes the greatest problems to them. The second place was taken by listening (24.6 %) and the third one by writing (16.9 %). Among the management-oriented courses, the final figure was slightly lower than among students of technical courses which may have been influenced by better communication competence which the

management-oriented students adopted from their secondary school. Although in both groups it was the highest number. Refer to Table 1.
The figures have supported our hypothesis no.1.

	Students of management-oriented courses [%]	Students of technical courses [%]	∑
writing	14.9	20.4	16.9
reading	13.8	7.3	10.7
listening	30.3	18.0	24.6
speaking	41.0	54.3	47.8

Table 1 *From the following English skills, I have the greatest problem with*

Question 2
From the following, I have the greatest problem with

a. grammar
b. vocabulary
c. pronunciation

Question 2 reflects on the overall results and the comparison of the figures of both subgroups in identifying the subjective problems of the students with writing, reading, listening and speaking. The figures are summed up in Table 2. There are 47.2 % of all students who chose grammar as the most problematic area from the systems (grammar, vocabulary and pronunciation). However, we can see the difference between the two groups of students. Whereas the technical students reported the greatest problems with grammar, the management-oriented students stated vocabulary as the most problematic area (see Table 2). Hence, we can conclude that assumption no. 2 has not been confirmed.

	Students of management-oriented courses [%]	Students of technical courses [%]	∑
grammar	39.5	52.7	47.2
vocabulary	52.9	36.7	45.3
pronunciation	7.7	10.6	7.5

Table 2 *From the following, I have the greatest problem with*

We can claim that the assumption no. 3 has been confirmed because 47.2 % of all students stated they would ‘often’ need to use English language in their profession and

hence we can say they realize that English language will be part of their professional life (see Table 3).

Question 3
How often do you think you will use English language in your profession?

a. never
b. rarely
c. sometimes
d. often
e. very often, it will be an essential part of my work

	Students of management-oriented courses [%]	Students of technical courses [%]	∑
never	0.4	0.8	0.5
rarely	2.7	1.2	2.3
sometimes	36.0	35.5	35.4
often	48.3	42.9	47.2
very often, it will be an essential part of my work	12.6	19.6	14.5

Table 3 *How often do you think you will use English language in your profession?*

Question 4
I suppose that in my profession I will mostly apply my English language skills

	Students of management-oriented courses [%]	Students of technical courses [%]	∑ [%]
a. in everyday communication	40.6	39.2	39.9
b. in written communication with customers and business management	47.5	37.6	42.7
c. in oral communication with customers and business management	51.7	44.9	48.4
d. in written expert communication	11.5	20.0	15.6

with colleagues from my field			
e. in oral expert communication with colleagues from my field	13.0	27.3	20.0
f. in writing reports	27.6	26.5	27.1
g. in reading professional journals	32.6	46.1	39.1
h. in giving presentations and taking part in conferences	29.9	29.4	29.6
i. in business negotiations	41.0	29.4	35.4
j. in technical support for customers	8.4	15.5	11.9
k. in communication with suppliers of goods and services	47.5	38.4	43.1

Table 4 *I suppose that in my profession I will mostly apply my English language skills*

The results (see Table 4) show that 48.4 % of all students stated they would need to apply their English language skills in oral communication with customers and business management. 43.1 % of the students thought they would apply it in communication with suppliers of goods and services and 42.7 % chose written communication with customers and business management option. As long as students were allowed to choose more options in this question, the hypothesis has only been confirmed in case of the option 'oral communication with customers and business management'. We cannot state perspicuous preference of any other option. Therefore we refer our readers to see Table 4 which contains the percentage of individual items. Still there are differences between the two groups which might be caused by the differences in the professional orientation of students.

Question 5
What are your expectations from the English language courses at the university?
In the course I would include more...

	Students of management-oriented courses [%]	Students of technical courses [%]	∑ [%]
a. written tasks on general vocabulary	40.2	30.2	35.4
b. written tasks on professional vocabulary	23.8	32.2	27.9
c. tasks for practicing pronunciation	15.3	15.5	15.4
d. written grammatical tasks	22.6	30.2	26.3

e. listening activities	51.7	40.0	46.0
f. reading tasks on general topics	20.3	17.6	19.0
g. reading tasks on professional topics	17.6	29.4	23.3
h. conversations focused on general vocabulary practice	63.6	53.5	58.7
i. conversations on professional vocabulary practice for the needs of future profession	40.6	47.3	43.9
j. writing activities for improving writing skills	16.1	18.0	17.0

Table 5 *What are your expectations from the English language courses at the university? In the course I would include more...*

The results in Table 5 show that 58.7 % of all students would like to practice more conversations focused on general vocabulary practice, 46.0 % would like to practice more listening activities and 43.9 % would include conversations on professional vocabulary practice for the needs of their future profession. However, hypothesis no. 5 has been confirmed as long as the option h) was mostly preferred.

Question 6
Would you like the number of English language lessons per week to be

a. increased
b. reduced
c. unchanged

As we assumed 54.5 % of all students did not report desire to change the number of language lessons per week. Surprisingly, the number of students who would like to increase the number of language lessons represented 42.3 % of all students (see Table 6). Therefore we cannot definitely state that the hypothesis no. 6 has been confirmed, yet there is just an insignificant number of students who would like the number of English language lessons per week to be reduced and that is a positive signal towards English language education at the university.

	Students of management-oriented courses [%]	Students of technical courses [%]	∑ [%]
increased	45.2	39.2	42.3
reduced	3.1	3.3	3.2
unchanged	51.7	57.5	54.5

Table 6 Would you like the number of English language lessons per week to be ...

In the open question, students suggested various changes to be taken in the English courses which are offered. Provided below are some of the suggestions which were mentioned repeatedly:

- to reduce the number of students in English classes (note: number of students ranks from 15-30 at present);
- to divide students into groups according to the level of language on the basis of placement tests;
- to teach English language from the first year of study (note: most study programs provide English courses from the second year of bachelor's study);
- to invite native speakers to lead part of the course;
- to support communication with teachers outside the class in English;
- to include watching documentary films or videos in English;
- to practice situational conversations and solve model situations;
- to use authentic materials instead of course books;
- to educate English teachers in the field the students study;
- to practice grammar in oral/speaking activities;
- to support making presentations at lessons;
- to teach more of everyday English;
- to implement games into teaching/learning process;
- to include writing essays or some compositions;
- to prepare more demanding entrance exams;
- to give more credits for passing the English language course.

Conclusion

The results of the questionnaire and the answers of students ensured us that the conception of the English language education of technically-oriented and management-oriented study programs at the University of Zilina needs to be reconsidered and it should be prepared in order to satisfy both the needs of the international job market and the subjective needs of university learners. The change must be complex and it includes the organizational changes as well as changes in the contents of individual

language courses. Moreover, the materials used in the courses will have to be up-dated. All of these have to go hand in hand with the enhancement of the development of the communicative competence. To be able to achieve the suggestions mentioned above, we have to conduct research based on the similar subjective needs analysis questionnaire among professionals and to find out the differences between subjective needs of undergraduates and professionals.

Furthermore, in order to get the objective information, we will have to test the students of the University of Zilina to figure out the level of language they are at, so that the courses are in line with it as well. To conclude, we can only say that we urgently feel the need to up-date the content of the courses and materials as well as the methods used within.

References

ALLWRIGHT, R. L. 1982. Perceiving and pursuing learner' needs. In M. Geddes, G. Sturtridge (eds.). *Individualisation.* London: Modern English Publications, p. 24-31.

DUAN, P. 2004. Teaching Trial and Analysis of English of Technical Communication. In *Asian EFL Journal* [online], vol. 6, 2004, no. 1 [cit. 2011-01-05]. < http://www.asian-efl-journal.com/04_pd_wg.php>.

GONDOVÁ, D. – ŠIPOŠOVÁ, M. 2010. *Teaching English: A Guidebook for English Teacher Trainees*. Žilina: Edis, 2010.

KANDIL, A. *Needs Analysis and the Arab Learners*. [cit. 2010-12-15]. < http://ilearn.20m.com/research/needs.htm>.

SCRIVENER, J. 2005. *Learning Teaching. A Guidebook for English Language Learners.* Oxford: Macmillan Publishers Limited, 2005.

SONGHORI, M. H. 2008. Introduction to Needs Analysis. In *English for Specific Purposes World* [online]. 2008, no. 4, p. 10-13. [cit.2011-01-08]. <http://www.esp.world.info/Articles_20/DOC/Introduction%20to%20Needs%20Analysis.pdf>.

REVIEWS

Freedom as a creative value in postmodern society (Zuzana Žilová)

EDIS, Žilina, 2010. 123 s. ISBN 978-80-554-0225-3.

Róbert Ďurka*

This work depicts the role of human freedom in contemporary society. It tries to analyze how freedom can be understood in the period of pluralism, consumerism and globalization regarding various modern (Freud, Frankl, Guardini) and postmodern ethical theories (Lyotard, Foucault). The study originates from Erich Fromm's recognition of: 'freedom from something' and 'freedom for something', stating the phenomenon of autonomous morality to be a crucial point in unclear fragmentary situation. The aim of the work reveals new horizons how freedom can be used to solve topical problems of the 21st century.

The work consists of two parts. The descriptive part portrays theoretical aspects of freedom considering its relation to different motivations (instincts, intellect, and consciousness). Special attention is paid to the fact of how freedom can be experienced in real-life situations. Different connections are mentioned: freedom and power, freedom and politics, freedom to love all created beings. The second part is more prescriptive bringing up new attitudes to the role of freedom. With the appreciation of postmodern plurality, it stresses all possible challenges humankind is facing in the vague moral situation: exaggerated individualism, hedonism, spiritual emptiness, environmental imbalance, emotional distress. These areas represent fields in which freedom can innovatively interfere. Thus, freedom is connected with responsibility, respect, zealous participation in human development and, most importantly, the appropriate notion of a human being whose main feature is the creation 'Imago Dei'. By this explanation, the study typically admits that the approach to human freedom depends on very ontological fundamentals that are subsequently connected to social, moral and environmental levels.

The beneficial element of the work can be seen in the creative approach to the topic that revives spiritual and religious roots of Western civilization. The Christian concept

* Róbert Ďurka, Faculty of Arts and Letters, Catholic University in Ružomberok, Slovakia; robert.durka@ff.ku.sk;

the author bases the theories on does not refuse the profusion of cultural codes. By application of such thinkers like Pierre Teilhard de Chardin, Robert Spaemann or Karol Wojtyła, plurality is introduced to be an element challenging the autonomy and critical thinking of a person. Freedom, in a form of autonomous morality, is an evaluative element that, while making decisions, takes into consideration the reality as a whole. It is not a tool of egoistic fulfilment of the human race but a gift to develop the world in all directions. The study shows that the Christian concept is fully empowered to comment on the situation, especially if stressing the unique ideas of hope, enthusiasm, and final consummation so missing in postmodern pessimism. However, the realization of these ideas can be seen as questionable as the society has gone through the process of secularization, incredulity to big explanatory theories and antipathy to religious systems. Thus, the topic remains open to further examination. The monograph provides new views on human freedom offering new inspirations not only for students and scholars, but also by all who take up interest in contemporary ethical matters.

Qualitative approximation in the system of Slovak and English short vowels (Zdena Kráľová)

PrintActive s.r.o. Ústí nad Labem, 2010. 120 p. ISBN 978-80-7414-268-0.

Danica Gondová [*]

Recently, an interesting book has been published at the Pedagogical Faculty at J. E. Purkyně University in Ústí nad Labem. The aim of the publication is to determine the quality of the English pronunciation of non-native speakers. The work also seeks ways to improve the non-native speakers' pronunciation applying appropriate teaching methods. Through the approximation of sound features of one's mother tongue to the foreign language, one tries to interact with a foreigner in a more effective way. In her work, Z. Kráľová researches the process of the quality approximation of Slovak and English vowels. The primary objective of her research was to find out the way of increasing the approximation – the similarity of the English pronunciation of Slovak speakers to the pronunciation of English native speakers.

In the theoretical part, the author pays attention to the issues of the phonic competence – its research, factors and the teaching process. Her careful observations and discussions are supported by more than 200 bibliography items which became the source of creative inspiration for her own research. The main focus of the work is the quality of English pronunciation of Slovak speakers determined through the formant structure of vowels and the evaluation of the pronunciation level by native speakers. The targeted probes into sound recordings enable the comparison of the effectiveness of contrastive and non-contrastive meta-phonetic input in teaching foreign language pronunciation in the Slovak university environment. The sound material was analysed both perceptively and experimentally (the LPC method of measurement of spectral cross-section). The author discusses what results could be achieved when teaching the pronunciation in a non-authentic environment. She supports the idea that it is necessary to apply the contrastive analysis of the native and foreign languages, linked with the theoretical prediction of interference phenomena. Thanks to the above mentioned features and the interdisciplinary framework, the book is unique and along with the dominating phonetics and exact sciences, it is also rooted in pragmatics, psycholinguistics, neurophysiology and lingua-didactics.

[*] Danica Gondová, Faculty of Humanities, University of Žilina, Slovakia,
danica.gondova@fpv.uniza.sk

INFORMATION

International Scientific Conference & International Workshop *Present Day Trends of Innovations 2010* 3rd-4th June 2010 Trenčín, Slovak Republic

Ladislav Várkoly*

The International Scientific Conference *Present Day Trends of Innovations 2010* (DTI 2010) & the International Workshop were held between 3rd and 4th June 2010. The chairman of the scientific committee and the person who initiated the event is prof. Ladislav Várkoly, the head of the Institute of Vocational Subjects and Information Technology, Dubnica Technological Institute in Dubnica nad Váhom.

The International Scientific Conference DTI 2010 was organized by Dubnica Technological Institute in Dubnica nad Váhom together with e-learnmedia, s.r.o., Dupres Consulting, s.r.o. and Dupres, s.r.o. in cooperation with

- Politechnika Radomska im. Kazimierza Pułaskiego, Wydział Nauczycielski;
- Instytut Technologii Eksploatacji – PIB w Radomiu;
- Politechnika Czestochowska, Wydział Zarzadzania;
- Panstwowa Wysza Szkoła Informatyki i Przedsiebiorczosci w Łomży;
- Uniwersytet Rzeszowski;
- National Academy of Sciences of Ukraine, Karpenko Physico-Mechanical Institute in Lviv;
- Vysoká škola manažmentu in Trenčín;
- J. Selye Univerzity in Komárno.

The International Scientific Conference DTI 2010 board counted 16 professors. The International Scientific Conference DTI 2010 was the first formal meeting of the academic research in the field of IT technologies and their application at universities.

* Ladislav Várkoly, Dubnica Technological Institute, Dubnica nad Váhom, Slovakia; varkoly@dti.sk

The audience consisted of teachers, scientists, young researchers, postgraduate students and engineers from Slovakia and neighbouring countries. More than 120 persons participated in the conference DTI 2010. The conference focused on the current use of modern technologies and devices, forthcoming trends as well as the newest innovations in this field.

Within the scope of the conference there were the following themes:

- modern e-learning technologies and informational systems;
- education management;
- internet schools and online courses;
- electronic educational materials and modern interactive teaching aids;
- modern teaching aids and interactive sensoric modules;
- virtual laboratories and remote experiments;
- operational reliability and safety of technologies and applications;
- automotive information technologies.

All papers written by 82 authors presented at the conference sessions and at the poster session were published in the conference proceedings containing 49 articles providing a comparison of innovative trends on the international basis: *Dnešné Trendy Inovácií 2010*, Várkoly, L. (Ed.), Trenčín, 2010.

At the closing session of the DTI 2010 prof. Várkoly discussed the venue of the conference DTI 2011 – two possible options were proposed: Dubnica Technological Institute in Dubnica nad Váhom and Panstwowa Wysza Szkoła Informatyki i Przedsiebiorczosci w Łomżi.

The aim of the International Workshop (after the conference DTI 2010) was to share the information and facilitate the collaboration regarding progressive and innovative forms of education and also the dissemination of future international research in this field.

Notice:

1) Six international scientific-research grants headed by prof. Várkoly were successfully negotiated by the conference DTI 2010 participants and are being worked on.
2) Vocational and media partners of the International Scientific Conference Present Day Trends of Innovations 2010 were:

ACTA TECHNOLOGICA DUBNICAE

Acta Technologica Dubnicae is an interdisciplinary journal whose primary objective is to fulfill the need for thorough discussion of research results in disciplines relevant to pedagogical, psychological and technological aspects of education and to contribute towards the wide diffusion of scientifically sound contributions in this domain.

Guide for Authors

Submission of an article implies that the work described has not been published previously, that is not under consideration for publication elsewhere, that its publication is approved by all the authors, and that, if accepted, it will not be published elsewhere in the same form, in English or in any other language. A letter will be sent to the corresponding author confirming receipt of the manuscript.

Please write your text in good English (American or British usage is accepted, but not a mixture of these). The submission should not exceed 20 pages with figures and tables (format A4, Times New Roman 12, single space). Use decimal points (not commas); use a space for thousands (10 000 and above).

Provide the following data on the title page (in the order given):
Title. Concise and informative. Avoid abbreviations and formulae where possible.
Author names and affiliations. Present the authors` affiliation addresses below the names. Provide the full postal address of each affiliation, including the country name, and, if available, the e-mail address of each author.
Corresponding author. Clearly indicate who is willing to handle correspondence at all stages of refereeing and publication.
Abstract. A concise and factual abstract is required. The abstract should state briefly the purpose of the research, the principal results and major conclusions.
Keywords. Immediately after the abstract, provide 3-5 keywords, avoiding general and plural terms and multiple concepts.
Abbreviations. Define abbreviations that are not standard in this field at their first occurence in the article.

Subdivisions of the article. After the abstract, divide your article into clearly defined and numbered sections. Subsections should be numbered 1.1, 1.2, etc. Any subsection may be given a brief heading.
Appendices. If there is more than one appendix, they should be identified as A, B, etc. Tables and figures should be given separate numbering (Table 1, Figure 1), etc.
Acknowledgements. Place acknowledegements before the references.

References. The list of references (according to ISO 690) should follow the paper. Responsibility for the accuracy of bibliographic citations lies entirely with the authors. Citations in the text: please ensure that every reference cited in the text is also present in the reference list (and vice versa). Citing and listing of web references: as a minimum, the full URL should be given. All citations in the text should refer to the authors` names and the year of publication (e. g., Gordon, 2002; Gordon and Jones, 2002; Gordon et al., 2002). References should be arranged first alphabetically and then further sorted chronologically if necessary. More than one reference from the same author(s) in the same year must be identified by the letters "a", "b", etc., placed after the year of publication.

Reviewing policy
All submissions are sent to at least two anonymous referees and will only be accepted on the basis of stringent peer review. One set of page proofs will be sent by e-mail to the corresponding author, to be checked for typesetting/editing.

The editorial policy and the technical content of the journal are the responsibility of the Editors.
Authors are encouraged to submit their papers electronically to atd@dti.sk
Instructions to authors and information about the journal: http://www.dti.sk/atd

ISSN 1338-3965
EV 4309/11