1. OBJECTIVES

The main purpose of this paper is to present the implementation of a 6 sigma project to solve a real problem identified in Medicine Faculty from the “Lucian Blaga” University of Sibiu. The case study approach is based on the evaluation of the risks of accidents and occupational disease.

2. Research Methodology

2.1. INCDPM Method

INCDPM method consists in identifying all the risk factors existing at the analyzed workplace. The method is based on the predetermined checklists and on the risk scale quantifications based on the combination of the severity and the frequency of maximum possible consequences on the human body. The result of this method is the finally partial risk level for every risk factor and overall risk level for the whole system analysis. The working tools used by this method are (Băbut, 2009):

- the listing the identification of risk factors;
- the listing the possible consequences of the identified risk factors on the human body;
- the scale rating of severity and probability identified risk factors consequences on the human body;
- the key risk assessment;
- the scale levels of risk classification / occupational safety;
- the assessment of the workplace data;
- the proposed action plan.

2.2. Six Sigma Methodology

6 Sigma was initiated by Motorola, in ’80s, as a challenge to obtain a decrease of the product’s error level. In order to obtain this effect, a deep analyze of the causes and of the correction’s possibilities was necessary. Motorola published in the middle of ’90s the details of its’ framework of the quality’s improvement which were adopted since then by many companies (Kifor, 2006). The method intends to obtain products and process without defects. A 6 Sigma improvement process has the following steps (Kifor, 2006):

b) Step 1 DEFINITION. The deficiencies that have to be approached will be clearly specified and the improvement estimated should be defined in measurable terms. In order the project to succeed, a team has to be created for that specific project and also the resources and the necessary time should be properly allocated.

c) Step 2 MEASUREMENT/ANALYSIS. In this stage the team discovers the real causes of the deficiency.

d) Step 3 IMPROVEMENT. In this step, the team is dealing with the defining the improvements that have to be made for the identified causes.

e) Step 4 CONTROL. The improvement team elaborates and implements the control elements.

f) Step 5 MULTIPLYING THE RESULTS. Once that the improvement team obtains the positive results, two more responsibilities emerge:

- supporting the other employees of the organization having similar problems in applying the knowledge learned by team in the previous improvement projects;
- nominating other projects to be dealt with. When correcting a flaw, one can often discover new flaws that were hidden maybe for years. Those flaws have to be distributed to other teams for resolving them.

2.3. Identifying the problems

The INCDPM method was used to establish the global risk level and the individuals risk levels from Medicine Faculty. The obtained data are centralized in Table 1 (***, 2011).
According to the INCDPM method, the accepted risk level must be less than or equal to 3.5. In this case study it is analyzed the Anatomy Laboratory because it was evaluated as having the highest risk level.

The concrete form of expression and the level of risk related to each risk factor are presented in Table 2.

2.4. Mapping the mission and the team selection

The established mission was: Improving the level of risk for priority issues from 6 to 3 for the academic year 2012-2013. The size and the composition of the improvement team were established at the request of the head of internal service for prevention and protection.

The team had 16 members as follows:
- Head of internal service for prevention and protection – Project Manager;
- Courses responsible;
- Head of economic and financial department;
- Assistant professors;
- Students.

2.5. Measurement and analysis

Defining the limits is the stage where are indicated the process limits: the beginning and the end of the project. The limits of the educational process are shown in the general flow diagram (Fig.1).

The improvement team identifies the main groups of causes using a cause-effect diagram (Figure 2).

The data collection process was conducted in the following stages:
- Building a questionnaire to quantify the frequency of the identified causes – the questionnaire was based on the causes identified using the cause-effect diagram; the sole requirement of the questionnaire was the selection of cause(s) for which the level of risk from working with toxics and carcinogens and the work in the environment with toxic fumes is acceptable for respondent.
- Choosing a scale to scoring the causes (it was used a „1-3-9 scale“ to scoring the causes: 1=less important cause; 3=important cause; 9=very important cause).
- Building the Pareto Diagram (Figure 3)
2.6. Improvement

The evaluation criteria for the identified alternatives were: the total cost, the impact, the cost/benefit ratio, the change impact, the implementation period, the uncertainty about the effectiveness. The selecting alternatives matrix was the quality tool used to evaluate the improvement alternatives.

<table>
<thead>
<tr>
<th>No.</th>
<th>Cause</th>
<th>Improvement alternative</th>
<th>Score</th>
<th>Resources</th>
<th>Responsible</th>
<th>Duration</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Leaky equipment</td>
<td>Forcing the teachers to check and record the sealing of the equipment at the end of each laboratory hours by regulations / job description;</td>
<td>15</td>
<td>M: office supplies; U: 1 person F: budget I: regulations</td>
<td>Dean</td>
<td>1 month</td>
</tr>
<tr>
<td>2</td>
<td>Unused exhaust ventilation installation</td>
<td>Installation of sensors to automatically start the exhaust system when toxicity level exceeds the allowable level</td>
<td>14</td>
<td>M: 8 sensors U: 1 person F: budget I: IT resources, user guides</td>
<td>Building administrator</td>
<td>1 semester</td>
</tr>
<tr>
<td>3</td>
<td>Inadequate equipment</td>
<td>Purchase the simulators where students carry out the laboratory works</td>
<td>13</td>
<td>M: computers U: 1 person F: budget I: IT resources, legislation</td>
<td>Teacher</td>
<td>1 semester</td>
</tr>
<tr>
<td>4</td>
<td>Missing measurements</td>
<td>Measurements by the authorized organizations</td>
<td>13</td>
<td>U: 1 person F: budget I: regulations, legislation</td>
<td>Dean</td>
<td>1 month</td>
</tr>
<tr>
<td>5</td>
<td>Regulation unobserved</td>
<td>Show the regulation in a visible place inside the laboratory</td>
<td>14</td>
<td>M: office supplies, notice board; U: 1 person F: budget I: regulations</td>
<td>Teacher</td>
<td>1 week</td>
</tr>
</tbody>
</table>

M: Material resources; U: Human resources; F: Financial resources; I: Informational resources

Figure 3: The Pareto Diagram
### Table 3: The Control Diagram

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Forcing the teachers to check and record the sealing of the equipment at the end of each laboratory hours by regulations / job description of.</td>
<td>Checking the regulations, job descriptions and recordings made by the teacher</td>
<td>HR Department, Deanship</td>
<td>Regulation Job description</td>
<td>Head of HR Department</td>
<td>Order the planned and established checking</td>
<td>Head of Department of Occupational Safety and Health</td>
<td>At the end of the project and annually</td>
<td>Audit report</td>
<td></td>
</tr>
<tr>
<td>Installation of sensors to automatically start the exhaust system when toxicity level exceeds the allowable level</td>
<td>Checking the sensors and their functionality</td>
<td>Anatomy Labs</td>
<td>Web-site, User Guide</td>
<td>Dean</td>
<td></td>
<td></td>
<td>At the end of the project and half-yearly</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Purchase the simulators where students carry out the laboratory works</td>
<td>Checking procurement documents and existence of the simulators</td>
<td>Financial Department Anatomy Labs</td>
<td>Regulation Web-site</td>
<td>Dean</td>
<td>Faculty Board</td>
<td>Order the planned and established checking</td>
<td>At the end of the project</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Measurements by the authorized organizations</td>
<td>Checking the measurements</td>
<td>Deanship Department of Occupational Safety and Health</td>
<td>Regulation Legislation</td>
<td>Head of Department of Occupational Safety and Health</td>
<td></td>
<td></td>
<td>At the end of the project and half-yearly</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Show the regulation in a visible place inside the laboratory</td>
<td>Checking the shown regulation</td>
<td>Anatomy Labs</td>
<td>Regulation</td>
<td>Decan</td>
<td></td>
<td></td>
<td>At the end of the project and monthly</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### 3. CONCLUSIONS

The identified issue remains an open problem for the future. It is necessary to provide a transformation in the teacher approaches and it can enforce the top management to implement an OHS Management system in the university. The OHS Management System must allow actions and procedures to continuous improvement of the OHS as a main component of the general management for each organization.

The organizations use different strategies to improve the performances and to promote the excellence in the current activities to distinguish and to increase the visibility. These strategies are sustained by implementation of the management system (e.g. OHS Management System, Quality Management System) or by using specific tools and techniques to improve the quality of the processes.

### References
7. Răduță, Gabriel, (2009), Metode de evaluare a riscurilor de accidentare și îmbolnăvire profesională. Suport de curs, Proiectul POSDRU/39/3.2/G/26581 „Formarea profesională în domeniul Securității și Sănătății în Muncă”.