THE DIMBI PROJECT – ADAPTING NEW METHODS OF TEACHING BUSINESS INFORMATICS

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Abstract. The purpose of this article is to find and analyze the existing methods of teaching business informatics. This research is limited to universities in Bulgaria teaching data warehouse (DW) and business intelligence (BI). The main approach for collecting data and analyzing it is content analysis. As the result of the analysis several new teaching methods are proposed. Their practical implications concern academic staff teaching business informatics. This paper is written within the Erasmus plus KA2 project “Developing the innovative methodology of teaching business informatics” (DIMBI), 2015-1-PL01-KA203-0016636.

Key words: business informatics, new teaching methods.

1. Query about tutor's awareness of DW/BI usability through DW/BI questionnaires

The purpose of this task is to find the awareness of teachers of DW/BI usability. There are two groups of tutor – one of them who are teaching Business informatics and the other group – who are not teaching Business informatics but need the use of DW/BI instruments. The awareness of DW/BI usability is studied through a face-to-face interview with a prepared questionnaire. The purpose of the applied method is to gather rather qualitative than quantitative information about tutor's awareness of DW/BI usability.

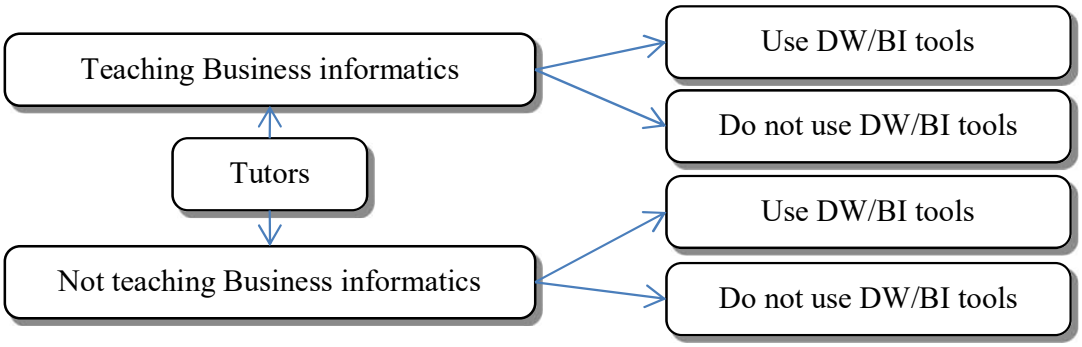

Figure 1. Tutors and business informatics
Source: Own contribution

People who teach DWH and BI are usually aware of theoretical concepts and they know very good examples of case studies. Most of the used software products come with ready-made examples which may be used for educational purposes. A significant problem is with licenses. Most tutors prefer to use open source software or trial versions of software products.

Conclusion 1.1	Good examples of the application of DWH and BI instruments are found in some software products.

This conclusion may be used as a starting point for further research and for providing DWH and BI courses to students not studying Business informatics and practitioners.

Tutors who teach DWH and BI courses sometimes focus too much on theoretical aspects and the use of one software products.

Conclusion 1.2	Some tutors who teach DWH and BI instruments usually use one software product for illustrating the taught courses.

This conclusion gives an opportunity to the DIMBI project to extend some case studies with the parallel testing of research questions in different software products.

The face-to-face talks with tutors who do not teach DWH or BI showed that they know about some software instruments but they do not know how to use them.

Conclusion 1.3	Some tutors know about the existence of DWH and BI instruments but they do not know how to use them.

This conclusion may be another opportunity for the DIMBI project. Providing e-books with well documented examples with sample datasets may provide fast getting of knowledge of the application of DWH and BI instruments.

Difficult and complex software products need a lot of time to be installed. New software products (such as Talend and HPCC) usually lack of documentations. So some tutors, who have experience with other software products, need a lot of time to learn new software products.

Conclusion 1.4	New software products (also open source ones) who come without documentation take too much of the tutors’ time to be studied.

This conclusion is a very good opportunity of the DIMBI team. Researchers from UJW, WUE and VUE may study different new open source software projects and offer a wide variety of case studies and real business examples.

2. Query on the needs of the universities in the field of innovative teaching methods Business Informatics

The need of new and innovative teaching methods is proved by the disadvantages of current teaching methods.

Business informatics is a fast growing and developing sphere of knowledge during the recent years. New software products, new technologies, new hardware devices appear. This fast growing industry requires specialists in business with high quality skills. Getting these skills may be done at universities. Using old-fashioned methods of teaching does not attract students.

Conclusion 2.1	University should offer innovative methods of teaching to attract more students.

The competitiveness of universities for first-year students, allow universities to apply new methods of teaching. This conclusion may be a good opportunity for the DIMBI project. Applying innovative teaching methods may give the chance to university to attract more students.

The technology change requires tutors with innovative think and applying new methods. Mega classes were popular 20 years ago but nowadays new approaches should be found.

Conclusion 2.2	University should close teaching methods using mega classes. Small groups of students should be taught.

This conclusion gives another opportunity for the DIMBI project. The change from mega classes to small groups of people allows branding in education. Small groups of people can benefit from the face-to-face contact with the tutor.

Giving knowledge to other people is a difficult task. Different kinds of pedagogical methods are well known. Since Business informatics is a complex field of study innovative approaches should be applied. One of them concerns studying in small groups of people, the other one – using only laboratories for teaching

Conclusion 2.3	Tutors should teach business informatics only in computer rooms.

This conclusion gives many opportunities to the DIMBI project. Since all researchers in the project have solid backgrounds of teaching, they may exchange their teaching experience.

In some cases students complain from too much theoretical knowledge and lot information that is not understandable.

Conclusion 2.4	Tutors should teach business informatics using case studies from real practice.

This conclusion is an opportunity for the DIMBI project. Sample datasets may be uses. Research questions may be defined. Several software tools (from the class of DWH and BI) may be used to accept or reject the research questions.

3. Query on existing teaching methods in the field of BI and DW in Bulgarian universities. Parameters of the implementation of these teaching methods

The query on the existing teaching methods of BI and DWH is done using the method “cabinet study”. Publicly available information is used. Information about teaching methods of Business informatics from Bulgarian universities is aggregated in the following table (table 1).

Table 1.

Teaching methods of DW and BI in Bulgarian universities

University	Specific methods	Tools
University of Economics Varna, Bulgaria	Small groups of people; Providing online courses; Using different software products;	Rapid Miner, PSPP, Ornage Canvas, Talend, HCPP, Alyuda Neurointelligence, Easy NN
Academy of economics Svishtov, Bulgaria	Including economical courses for students studying Business informatics	N/A
University of national and world economy, Sofia, Bulgaria	Studying not only disciplines concerning Business informatics, but also other disciplines aimed at business communications	N/A

Applying different teaching methods result in the drop-out of students.

Conclusion 3.1	Some students drop-out from universities because of the application of inappropriate teaching methods.

This conclusion may be used as an opportunity for the DIMBI project. Providing new methodologies of teaching Business informatics may lead to keeping the attraction of students and getting lower levels of drop-out students during the course of study.

Theoretical concepts are discussed during lectures with mega classes.

Conclusion 3.2	Theoretical concepts are discussed during lectures with mega classes.

This is a usual practice for many universities but the current situation may be changed using the aim of the DIMBI project. Decreasing the time in mega classes and teaching in small groups of people will benefit to better understanding of complex theoretical knowledge.

Sometimes students say that it is difficult to get practical skills. Getting practical skills depends mainly on the tutor and the methods of teaching.

Conclusion 3.3	Applying the appropriate methods of teaching results in getting specific skills in Business informatics.

The DIMBI project may benefit from this conclusion. The theoretical knowledge may be explained using real case studies.

Sometimes students say that they do not see the link between theory and practice. Lectures do not include examples. If there are examples during lectures, different examples are given during exercises (laboratories)

Conclusion 3.4	In some cases the practical examples in lectures and laboratories are different.

This conclusion gives an opportunity to the DIMBI project to provide new knowledge in the sphere of Business informatics by showing cases studies in computer rooms and not using old-fashioned lectures with mega classes.

4. Planning for new teaching methods taking into account the learning outcomes in terms of knowledge, skills and social competence

The new teaching methods consist of several approaches for the methodology of teaching.

Firstly, case studies with real examples from practice should be used. These examples will give confidence to students when solving real business situations. Case studies make the bridge between theory and practice.

Secondly, these case studies are accompanied by sample datasets. The datasets have several columns (describing attributes of data) and rows (for each case).

Thirdly, these datasets are provided as CSV files. Students will get specific knowledge for importing CSV files in different software products.

Fourthly, research questions are defined. This is a creative process and managers in practice sometimes find difficulty in defining sensible research questions. These questions should be answered by using the sample datasets (figure 2).

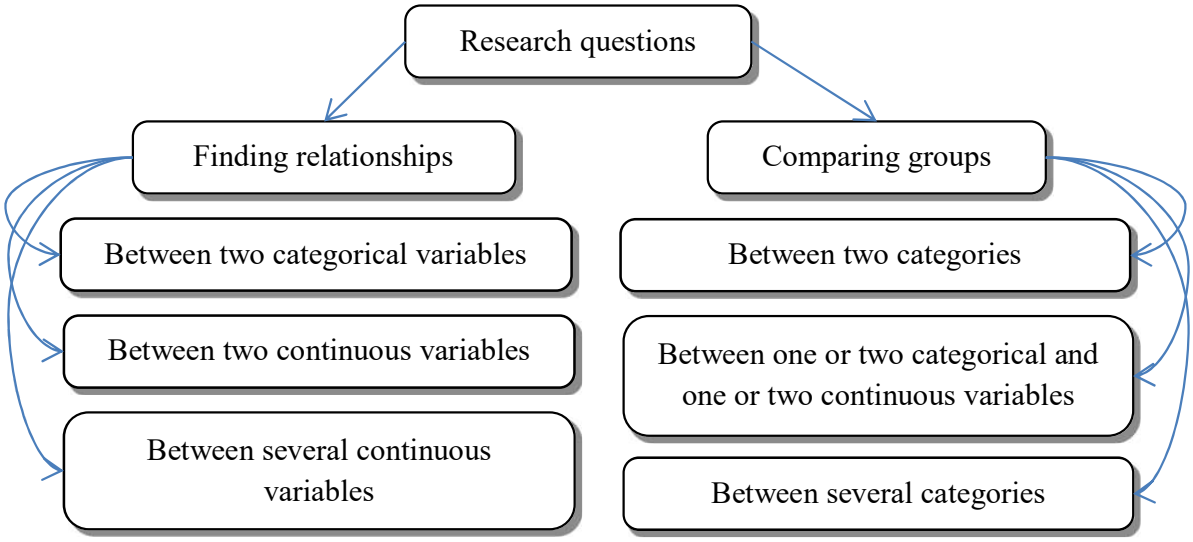

Figure 2. Methods for solving research questions
Source: Own contribution

Fifthly, students from three universities (IJW, WUE and VUE) will join two ISP. Students will get skills to work in teams and to work with colleagues from abroad. These soft skills will help them in future work in European projects.

Sixthly, students will get new knowledge and skills in the fields of DWH and BI having lectures and exercises from teachers from three different universities. Each tutor has his/her own approach for the methodology of teaching. Getting one and the same skills from different tutors will bring non-monetary benefits. Students who have background in EU projects are more willing to continue working on further EU projects. These students may generate proposals for the calls “New and emerging technologies” in H2020.

5. The preparation of the description of the methods taking into account the innovative elements that distinguish it from the existing

The description of the methods is the following:

- Providing real examples with case studies;
- Providing the description of these case studies in electronic format before having classes;
- Notifying students for the electronic version of the case studies;
- Starting the exercises;
- Discussion on questions before starting;
- Defining research questions;
- Using several software products by several tutors;
- Discussing the output of the software;
- Commenting on outliers, limitations, practical implications, interpretations of the output;

• Preparing the full description of the case study for the e-books (Intellectual outputs O3);

• Discussing on including new case studies with a short description, a dataset, research questions and not giving step-by-step information for solving them.

Since the project consists of several researchers, they should work in teams, e.g. by university. Each team should choose a sample dataset. For instance each team may choose one of the datasets provided by IBM:

https://www.ibm.com/communities/analytics/watson-analytics-blog/guide-to-sample-datasets/

The team will discuss on research questions. Each team member should use a different software product to prove or reject the research questions. As a result new case studies should be available for the e-books. These examples may be extended to research papers for online peer-reviewed journals.

The members of the DIMBI team have background in testing research questions (hypotheses) in different software products (Vasilev & Atanasova 2015).

6. Analysis developed drafts teaching methods in relation to the teaching

The analysis of the developed drafts of teaching methods is done by using quantitative methods. Several experts are interviewed about the new methods of teaching. For each teaching methods they provide strong aspects and threats (figure 3).

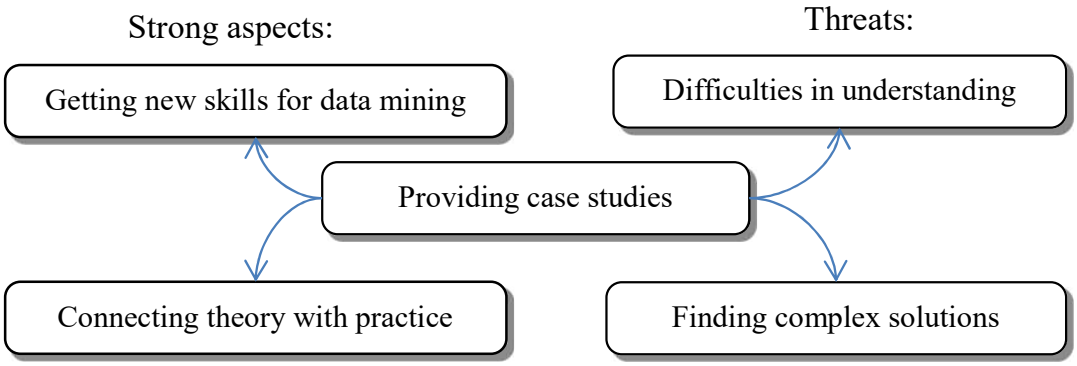

Figure 3. Teaching method 1 “Providing case studies”
Source: Own contribution

The marked threats of teaching method 1 give some opportunities for the DIMBI project. Further explanations and further reading sections within the e-books may help students in better understanding. Tutors should seek for fast and simple solutions to research questions. They should not focus too much time on complex solutions (figure 4).

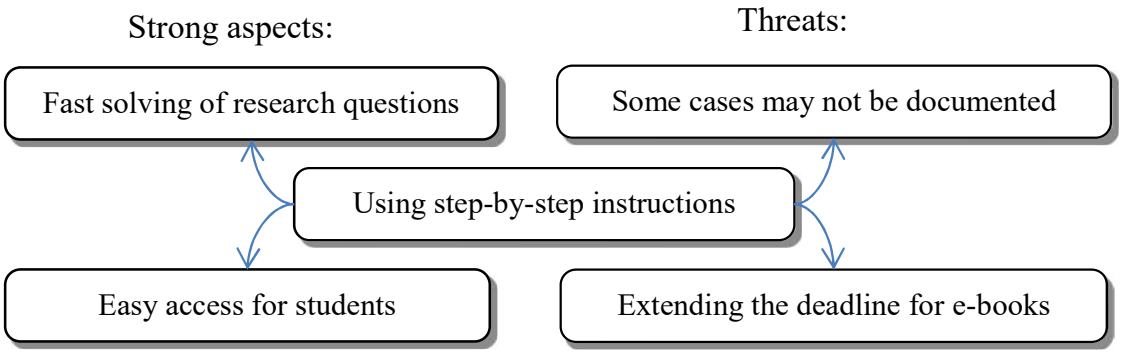

Figure 4. Teaching method 2 “Using step-by-step instructions”
Source: Own contribution

The marked threats of teaching method 2 give some opportunities for the DIMBI project. The scientific managers have to organize the work of researchers so that they will cope with preparing the description and explanations of case studied on time.

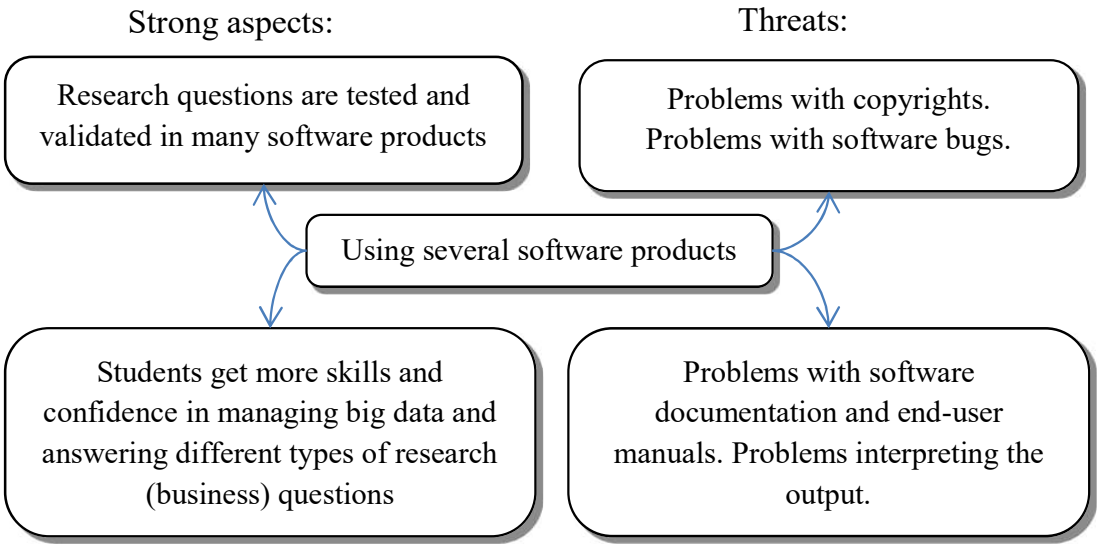

Figure 5. Teaching method 3 “Using several software products”
Source: Own contribution

The marked threats of teaching method 3 give some opportunities for the DIMBI project. The members of the DIMBI team may create better documentation and manuals for certain software products through the e-books (Intellectual output of the DIMBI project O3). The members of the DIMBI team should use open source software products and publicly available datasets.

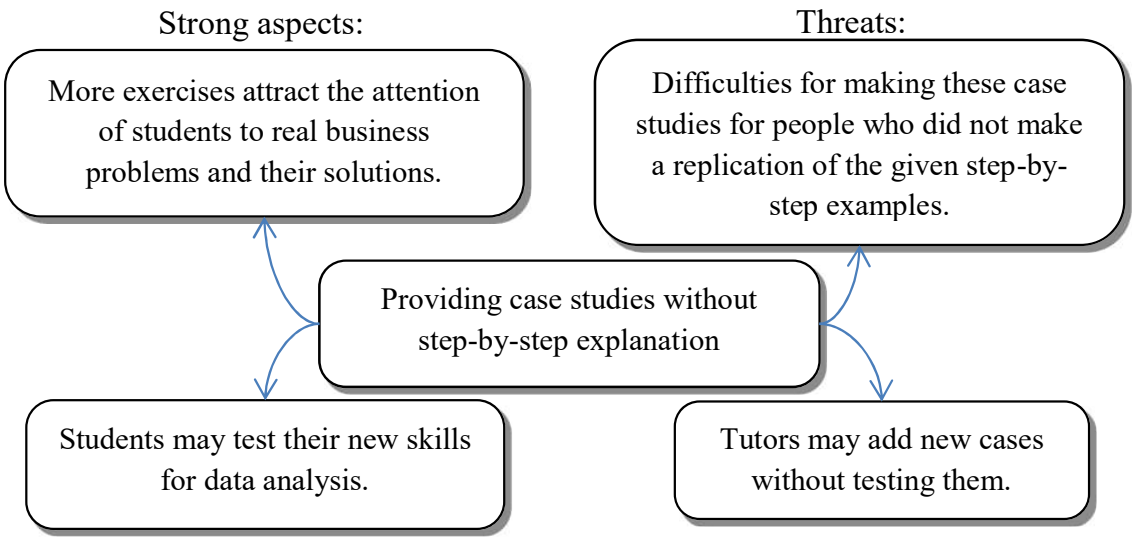

Figure 6. Teaching method 4 “Providing case studies without step-by-step explanations”
Source: Own contribution

The marked threats of teaching method 4 give some opportunities for the DIMBI project. Tutors should test the case studies without step-by-step explanations before adding them to the e-books. Each case should end with literature for further reading and links to other web sites solving similar problems.

7. Conclusion

As a result of this research several conclusion may be made.

Good examples of the application of DWH and BI instruments are found in some software products. Some tutors who teach DWH and BI instruments usually use one software product for illustrating the taught courses. Some tutors know about the existence of DWH and BI instruments but they do not know how to use them. New software products (also open source ones) who come without documentation take too much of the tutors’ time to be studied.

University should offer innovative methods of teaching to attract more students. University should close teaching methods using mega classes. Small groups of students should be taught. Tutors should teach business informatics only in computer rooms. Tutors should teach business informatics using case studies from real practice.

Some students drop-out from universities because of the application of inappropriate teaching methods. Theoretical concepts are discussed during lectures with mega classes. Applying the appropriate methods of teaching results in getting specific skills in Business informatics. In some cases the practical examples in lectures and laboratories are different.

Future work may focus on other novelties in teaching business informatics.

Literature

Vasilev, J. & Atanasova, T., 2015. Parallel Testing of Hypotheses with Statistical and Artificial Intelligence Methods : A Study on Measuring the Complacency from Education. *Computer Science and Applications*, 2(5), pp.206–211.