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### ANALYSIS OF STUDENTS' MOTIVATION AND PREDISPOSITION TO INTRODUCE CES EDUPACK SOFTWARE FOR TEACHING MATERIALS SCIENCE

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#### ABSTRACT

*The aim of the study was to examine the motivation and predispositions of students of the Faculty of Production Engineering at the University of Life Sciences in Lublin to attend laboratory classes in Materials Science supported with a computer program Cambridge Engineering Selector – CES EduPack in English. Determinants of the desirability of its use for first-year students were: the level of computer skills, interests of students in the issues of materials selection and knowledge of the English language, which supports the program. The survey consisted of 17 questions. The questionnaire was filled in by 81 students. The results confirmed the positive opinion of the respondents about the advisability of using a computer program for education purposes. Moreover, half of the respondents believe that during laboratory classes various forms of knowledge transfer should be combined. Students in a large majority show interest in the choice of materials for the products of everyday use. In contrast, they are afraid of or do not have an opinion on using software in English.*

### Introduction

Motivation to undertake actions aiming at increasing the attractiveness and improvement of knowledge acquisition on engineering materials included reduction in the number of teaching hours and deteriorating teaching results in the subject "Materials Science" among the students majoring in Agricultural and Forestry Technique and Production Management and Engineering of the University of Life Sciences in Lublin. The actions of previous authors while teaching students Materials Science at various majors of the University of Life Sciences allowed developing a specific, different than the one applied on technical universities, methodology of teaching, adjusted to present conditions, to the level of students and time possibilities (Grudziński, 2006). Research carried out by Kozielska and Kern (2011) proved that computer-assisted education on the university level develops imagination and creativity of students of technical universities. It was recognized that according to the trend prevailing in teaching, which consists in teaching many perception channels of a human being (sight, hearing, kinesthetic) (Kozielska, 2012) enabling students the use as

a supplementation of laboratory lessons, information technologies based on computer simulations, would be purposeful. Garcia et al. (2007) think that teachers' attempts aiming at making lessons more attractive along with development of information technologies offer new, more attractive and effective form of learning. Students who can choose between a traditional blackboard and chalk, a multimedia presentation and animation, prefer combining two or three media. Interactivity is the most important asset of multimedia teaching (Lieu, 1999).

Cambridge Engineering Selector – CES EduPack developed in the University in Cambridge is the most popular program which supports teaching material engineering worldwide including 12 universities in Poland. This program is based on the hierarchical manner of selection of material to specific applications, enables learning on various levels of educating material engineering (Granta Materials Intelligence, 2014). Using it requires basic skill of computer operation and English knowledge on the beginners' level.

### **Research methodology**

The objective of the paper was to check students' motivation and predisposition to laboratory classes during which the source of knowledge on materials was a computer program CES EduPack in English.

Investigation carried out with a guided survey in 2013 included the group of 81 students of the 2nd semester of the regular first degree studies at the Agricultural and Forestry Technique [AFT] (21% of the investigated persons) and Production Management and Engineering [PME] (79% of the investigated) majors at the University of Life Sciences in Lublin.

An anonymous questionnaire comprised 17 closed, half-open and directed questions. The questions concerned students' motivation to learning on engineering materials, their acceptance to the use of information technologies during classes, subjective assessment of English knowledge and computer skills, some personal data and verification of knowledge on basic computer skills.

### **Research results**

In the respondents group women constituted 24% at the AFT major and 45% at the PME major. While choosing the major, 47% of AFT students took into consideration their interests. Bzowska-Baklarz and Pieczykolan (2006) as well as Falińska and Bieniek (2009) obtained similar results. Among the remaining part of respondents not being qualified to the originally chosen major the possibility of finding attractive job after graduation was decisive in the selection of the major. Among the AFT students, 8% were guided by their interests and 52% by the possibility of finding attractive workplace after graduation.

After the educational reform, the number of students graduating from vocational schools, particularly technical secondary schools, decreased; mostly they are graduates of general secondary schools (Falińska and Bieniek, 2009). The investigation which was carried out proves these relations, because over 76% of the investigated persons completed a general secondary school.

Each year, the number of students of life sciences universities, who have access to a computer with Internet raises (Sołowiej et al., 2007; Lorencowicz and Kocira, 2009,

2010, 2012). Among the AFTstudents - 100% and among the PME students - 97% of the investigated in 2013 had access to computers and the Internet in the place of residence.

The AFT students (70%) and PME students (64%) assess their computer skills within the scale 1-5 as 4 or 5 respectively (fig.1).

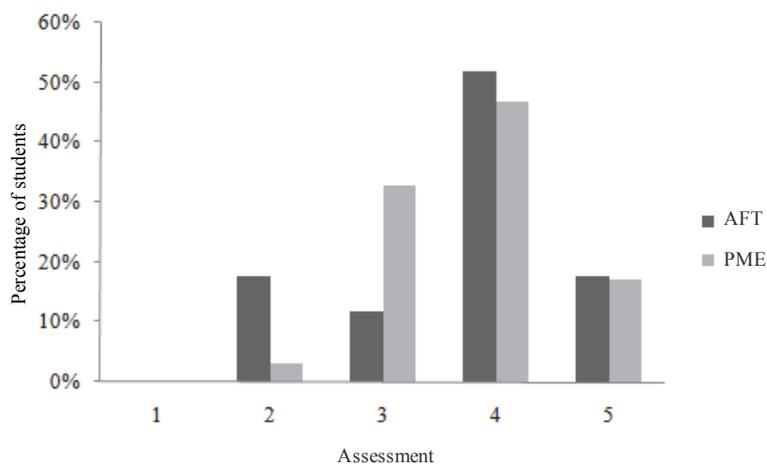


Figure 1. Assessment of computer skills declared by the students.

Verification of declarations of the questioned persons on computer skills degree, was carried out based on answers to the following questions:

1. Which set of file types is characteristic for computer graphics files?
2. Which address of the Internet website is incorrect?
3. How to change a font for the text fragment into a bold one?

Four answers: a, b, c, d could be chosen. The lower number of correct answers was given to the question 3-13% of students of the AFT major and 38% of the PME major (fig. 2). These results are surprising, because 91% of the investigated persons (Lorenkowicz and Kocira, 2009) uses MS Office packet in studying and 83% assesses their word processor skills as very good (Sołowiej et al., 2007). As much as 75% of the questioned answered correctly to the remaining questions, which cannot be recognized as a satisfactory result in the light of common use of the Internet and computer graphics by adolescents.

Majority of the questioned students (78% of respondents) thinks that using computer in laboratory lessons raised their activity (fig. 3). Additionally, over half of the investigated persons thinks that the most attractive form of carrying out laboratory lessons on the Materials Science is combining various activity forms, i.e. own work, group work, presentation of educational films, joined calculations, copying micro-structures presented by a lecturer.

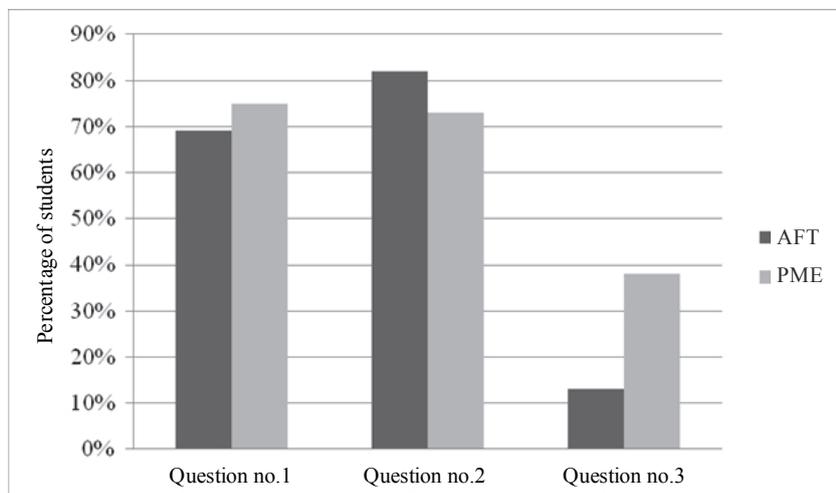


Figure 2. The correct answers to the questions concerning computer skills

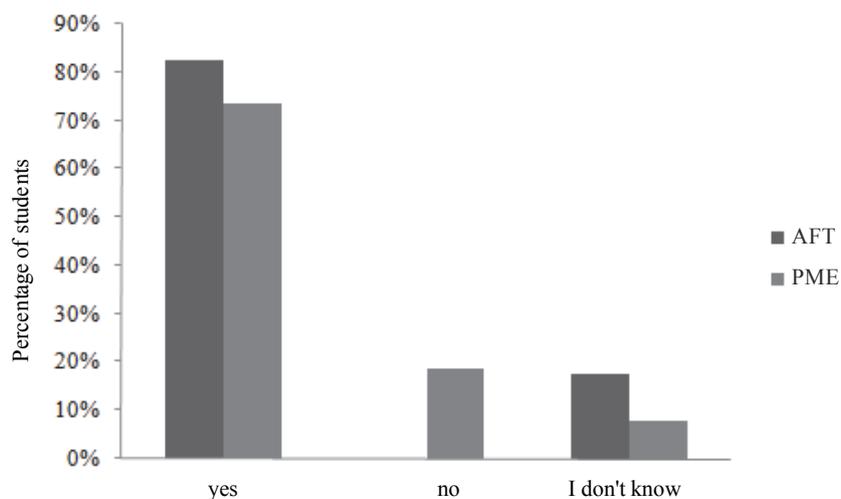


Figure 3. The positive impact of computer use in the laboratory classes for their attractiveness in respondents' opinions

It was found out that students show interest in issues related to selection of materials, especially to goods, which they use or which are related to their hobby. For example, over 80% of respondents would like to know with the use of a computer program, which factors decide on the selection of materials for cell phones casings (fig. 4).

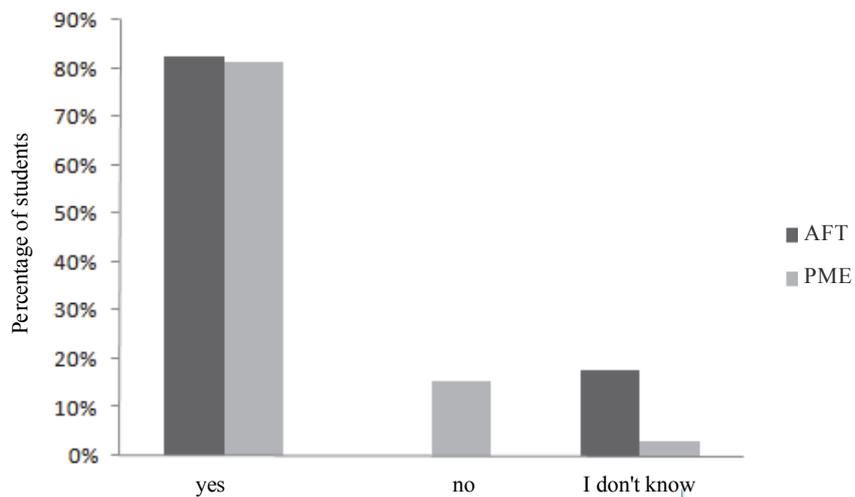


Figure 4. The results of students interest of the choice of materials for the casing of mobile phones with the help of a computer program

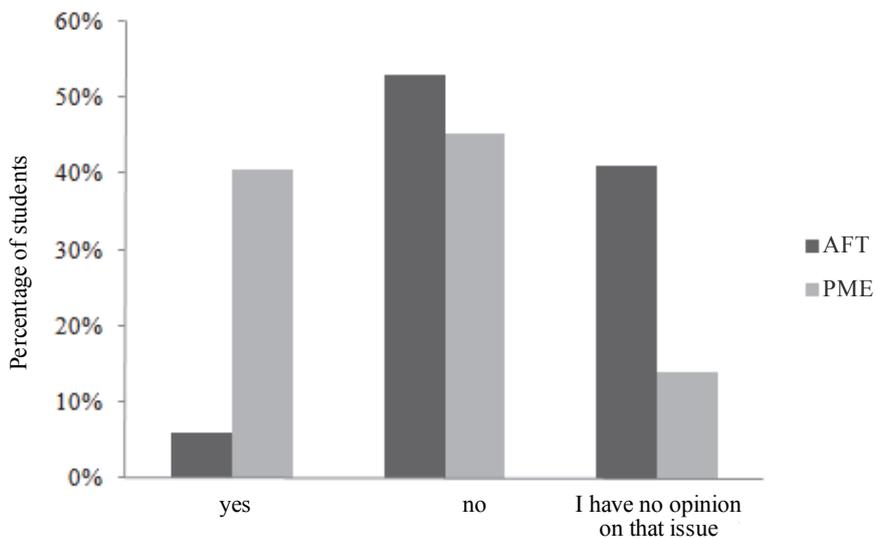


Figure. 5. Declaration of desire to participate in activities in which the source of knowledge about materials would be a computer program in English

Only 1 student of the AFT major would wish to take part in lessons, during which a computer program in English would be a source of knowledge. Among the PME students, 41% respondents expressed their wish to participate in lessons and 45% - would not like to take part in such lessons (fig.5).

Students' fears are related to poor, in their opinion, English skills. The AFT students (65%) and the PME students (77%) assess their English skills as 1 to 3 (fig. 6).

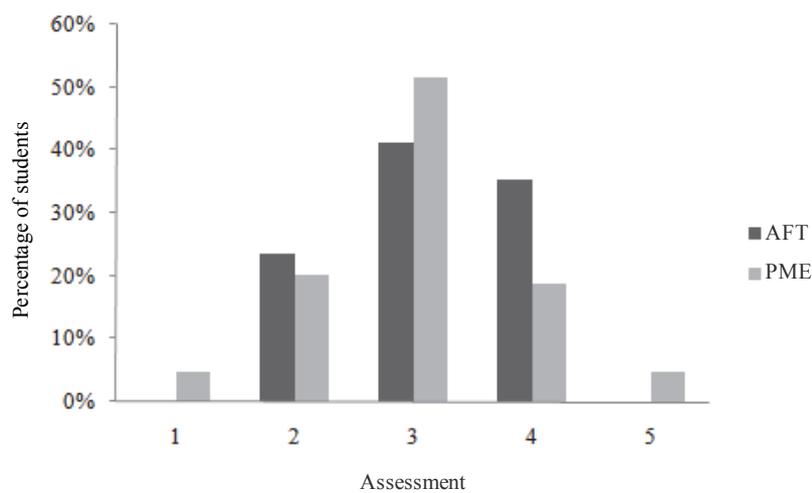


Figure 6. Subjective assessment of English language proficiency

## Conclusions

The analysis of answers to the questionnaire shows that students of the first year of the AFT and PME majors of the Faculty of Production Engineering feel the need to use IT as a supplementary means for the knowledge acquisition on laboratory lessons on the Materials Science. They are interested in engineering materials properties and possibilities of their application to modern uses.

Results of a survey compared with results of such research carried out a few years ago prove the increase of availability of computers with Internet access; however, the answers to the questions that verify the abilities to use the program by students were not satisfactory. It proves the necessity to implement changes in teaching programmes, which aim at increasing the number of activities in informatics and foreign languages, which had been alarmed earlier in the research on opinions of graduates of the University of Life Sciences in Lublin (Bzowska-Baklarz and Pieczykolan, 2005).

Students fears mostly concern their English skills and working on a computer program in foreign language. It concerns mainly AFT students. The questionnaire did not include questions verifying English skills of respondents, therefore it is difficult to verify students' opinions on a low level of this skill. Previous authors' experience related to demonstration of a film in English prove their full teaching usefulness, but only after informing students

on the subject of a film, providing the meaning of more important technical definitions, pausing a film in more important places and explaining phenomena presented in these moments. Thus, before implementation of teaching software it is very important to properly prepare students for lessons and use detailed activity instructions. On account of very poor results of the questionnaire on English skills, next research among respondents is planned with the use of a demonstration program CES EduPack.

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## **ANALIZA MOTYWACJI I PREDYSPOZYCJI STUDENTÓW DO WPROWADZENIA OPROGRAMOWANIA EDUKACYJNEGO CES EDUPACK PRZY NAUCZANIU NAUKI O MATERIAŁACH**

**Streszczenie.** Celem pracy było sprawdzenie motywacji i predyspozycji studentów Wydziału Inżynierii Produkcji Uniwersytetu Przyrodniczego w Lublinie do uczestniczenia w zajęciach laboratoryjnych z przedmiotu Nauka o Materiałach wspomaganych programem komputerowym Cambridge Engineering Selector – CES EduPack w języku angielskim. Czynniki warunkujące celowość jego zastosowania dla studentów pierwszego roku studiów były: poziom umiejętności obsługi komputera, zainteresowanie studentów problematyką doboru materiałów oraz znajomość języka angielskiego, w którym obsługuje się program. Badanie ankietowe zawierało 17 pytań. Ankietę wypełniało 81 studentów. Wyniki badań potwierdziły pozytywną opinię respondentów o celowości wykorzystania programu komputerowego do zajęć dydaktycznych. Ponad połowa badanych uważa, że w trakcie ćwiczeń należy łączyć różne formy przekazu wiedzy. Studenci w dużej większości wykazują zainteresowanie doбором materiałów na wyroby codziennego użytku. Natomiast obawiają się lub nie mają wyrobionej opinii na temat wykorzystania programu w języku angielskim.

**Słowa kluczowe:** materiałoznawstwo, oprogramowanie edukacyjne, ankieta