ESCOLA
DIGITAL TEACHING TOOLS FOR ENGINEERING LABS

2nd IITEEC

2nd INTERNATIONAL INSTRUCTIONAL TECHNOLOGIES IN ENGINEERING EDUCATION CONFERENCE

12th - 13th SEPTEMBER 2019

ABSTRACT PROCEEDINGS

EGE UNIVERSITY/ IZMIR, TURKEY

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SCHEDULE

September 12-13, 2019
Venue: Ege Üniversitesi Eğitim Fakültesi Kültür Salonu

Day 1, 12th September

08:30 – 09:30 Registration

09:30 – 10:00 Opening Ceremony: Prof. Dr. Necdet BUDAK (Invited)

ESCOLA Session - Chair: Özge ANDİÇ ÇAKIR

10:00 – 10:15 Digital Inclusion
Przemysław RÓŻEWSKI

10:15 – 10:30 Innovative Teaching
Lennard DROGENDIJK

10:30 – 10:45 Distance Learning
Boris EVSTATIEV, Tzvetelin GEORGIEV, Seher KADIROVA, Tsvetelina GEORGIEVA, Nikolay MIHAILOV

10:45 – 11:05 Videos and 3D simulations for laboratory
Özge ANDİÇ-ÇAKIR

11:05 – 11:25 Collaborative Learning in Virtual Environments
Orla CASEY

11:25 – 11:45 Resources for Engineering Education Instructors
Fırat SARSAR

11:45 – 12:00 ESCOLA Online Training Platform
Catherine NEILL

12:00 – 12:30 Coffee Break

ERASMUS+ Projects Session - Chair: Yekta GÖKSUNGUR

12:30 – 12:45 The Products of Project Digital Skills Accelerator
Przemysław RÓŻEWSKI

12:45-13:00 EMERGE Project for Training of Women Engineering Entrepreneurs
Orla CASEY

13:00-13:15 Kodlama Öğretimi Nasıl Olmalı? EduCode Projesi Örneği

E. Akpınar, B.Baran, K.Arslan

13:15 – 14:15 Lunch Break

Keynote Speech

14:15 – 15:00 ERASMUS+ Programı Yükseköğretim Alanı Stratejik Ortaklıklar (KA203) Tanıtımı

Bevran Belgin ALHAS
Avrupa Birliği Eğitim ve Gençlik Programları Merkezi Başkanlığı, TÜRKİYE ULUSAL AJANSI, Yükseköğretim Koordinatörlüğü

15:00 – 15:30 Coffee Break

Session 2 - Chair: Alev ATEŞ ÇOBANOĞLU

15:30 – 15:45 The Use of Virtual Reality and Arduino Systems to Demenostrate 3D Educational Examples
B. Alam

15:45 – 16:00 Balıkçılıkta Mühendislik Eğitiminin Önemi: Balık Ürünleri Nasıl Daha Uzun Süre Bozulmadan Korunabilir?
F. N. Bulat, B. Kılınç

16:00 – 16:15 Tüketiciler İçin Mühendislik Eğitiminin Önemi: Su Ürünleri Nasıl İyi Kalitede Tüketilebilir?
B. Kılınç, F. N. Bulat

16:15 – 16:30 Project Collaboration Qualities and Project Success: Moderating Effect of Knowledge Integration Capability
Q. Ul Ain, R. Ahmed, A. Altaf

16:30 – 16:45 Ders Notlarının İnternet Ortamına Aktarılması İçin Uygulama Önerisi
M. B. Selek, M. Sonkur

Day 2, 13th September

Session 3 - Chair: Beril CEYLAN

09:00 – 09:15 Impact of 3D Printing and Additive Manufacturing Technologies in Engineering Education
O. Çolak

09:15 – 09:30 Labview based Monitoring System Applied for Virtual Photovoltaic Power Station
A. Mühendis, A. A. Kulaksız

09:30 – 09:45 Distance Learning Tools Supporting Flipped Learning
T. Ayhan

09:45 – 10:00 Coffee Break

Keynote Speech

10:00 – 10:15 Experiences with Information and Communication Technologies in Engineering Education at Delft University of Technology.

Oğuzhan ÇOPUROĞLU, Delft University of Technology

Session 4 - Chair: Onur DÖNMEZ

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S. Biçen, Ç. Kandemir, M. Çelik

10:30 – 11:15 A Situational Awareness Assessment to Marine Engineering Students Integrated With Engine Room Simulator Exercises
Ç. Kandemir, S. Biçen, M. Çelik

11:15 – 11:30 Yükseköğretimde Programlama Derslerine Yönelik Bir Otomatik Ödev Notlandırma Sistem Modeli Önerisi
A. Arslan, N. Özdamar

Session 5 - Chair: Sayit SARGIN

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B.Baran, B. Ceylan, A. Şendemir, Ö. Andiç Çakır, A. Tokuç, F. Avcı Özbakan, T. D. Altun, G.Köktürk, F. Sarsar

11:45– 12:00 Enhancing Computer Engineering Students' Learning: Pedagogical Implications for Logic Design Course
B. Balcı, B. Çiloğlugil, N. Atman Uslu, M. M. İnceoğlu

12:00 – 12:15 A Software Prototype for Collecting Meta-Data from Academic Databases
İ. Kabasakal

12:15 – 12:30 Closing Ceremony

How Coding Education Should Be? Example of EDUCODE Project*

Ercan Akpınar[1], Bahar Baran[2], Kürşat Arslan[3]

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Abstract

After introducing new curriculum during education reform in primary and higher education in Turkey, computational thinking and related coding education has become among the important research areas. It is possible to find many studies in the literature that indicates how Scratch, Arduino, and LOGO can be used to facilitate coding. On the other hand, it has not been adequately researched how the pedagogical dimension of coding education should be for teachers and no practical products have emerged. In this context, this project "2017-1-TR01-KA203-046578, INCREASING THE COMPETENCY OF COMPUTER SCIENCE TEACHING UNDERGRADUATES ON CODING EDUCATION (EDUCODE)" was supported by the European Commission Erasmus+ and was prepared for the deficiency. The main aim of this project is to develop a curriculum and teacher handbook for the development of pedagogical skills of prospective teachers in coding education. Within the scope of the project, needs analysis was conducted with the participation of project partners before the curriculum was formed, and coding curriculum was created based on the results obtained. The curriculum is designed as 5 units and 10 courses, and the relevant theoretical framework and activities are established for each course. The purpose of this oral presentation is to share the details of the process of developing two intellectual outputs identified as curriculum and teacher handbook in the project.

Keywords: Coding Education, IT and STEM Teacher candidates, Pedagogy, EDUCODE

*This project has been funded with support from the European Commission. This publication reflects the views only of the authors, and the Commission cannot be held responsible for any use which may be made of the information contained therein.

The use of virtual reality and arduino systems to demenostrate 3D educational examples

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Abstract

While engineering means finding solutions to different problems, engineering education in most universities fail to adopt a new and modern education method. To go over traditional methods of how to do the basics of calculating and analyzing materials and structures, some new techniques that deliver the required idea through a medium other than papers should be considered. Yet, most of the times, it is impossible to have such real examples or equipment at every school or facility. For that, new methods like virtual reality or augmented reality can offer a lot by bringing 3D models to life and allowing students to move around and explore them anytime anywhere. However, using those methods needs to learn some new skills and applications in order to reach the desired performance. Creating such a virtual environment go through tree main phases. First, the 3D models related to the subject should be created. Then, after choosing the proper user interface, the required application can be built. Finally, the 3D models can be transformed to the virtual/augmented reality environment to be used with the adequate controllers. This paper offers a review on how to create such an application using low financial resources. Moreover, a controller system based on Arduino devices is also suggested to be used as a low cost system in such environments.

Keywords: Virtual reality, Arduino, 3D examples

The Importance of the Engineering Education on the Fisheries: How fishery products can be protected from spoliage more longer time?

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Abstract

Three sides of Turkey are surrounded by seas and seafoods are very important nutrient for human consumption. Therefore, importance should be given on seafoods, the education should be given to fishermen for reaching high quality of seafoods to consumers. For this aim, the education for fishermen is so important. Fishermen need to be awareness and information about diseases; seafood origin diseases, infections routes, the prevetion of contamination, storage conditions to prevent deteriorations, the applications of cold chain on seafoods, delaying deterioration, what needs to be done to protect freshness and to avoid spoliage. It is thought that these trainings should be given to the fishermen by trained fisheries engineers. So, high protein content and high quality seafood products should be reached to the consumers in a healthy way. The aim of these educations is to give fishermen visually and audiovisually using advanced technological systems in accordance with international standards, to raise awareness by showing international fishing techniques to fishermen and to increase the applicability of these advanced techniques in Turkey. It is thought that the implementation of awareness-raising activities in Turkey and monitoring-supervision activities will be done effective to reach higher quality seafoods to consumers.

Keywords: Education, fishery, seafoods, quality, food safety.

The Importance of Engineering Education For Consumers: How seafoods can be consumed more higher quality?

Berna Kılınç[1], Fevziye Nihan Bulat[2]

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Abstract

Seafoods have high protein content and also cheap products for consumers. However, seafoods are very fast perishable foods, So consumers need to be taken precautions to prevent the formation of microorganisms on seafoods. Microorganisms, originating from seafoods, showing an increase due to improper applications in storage conditions. Therefore, thawing and cooking are so important applications for seafood quality. It is thought that Engineering Education given to consumers will be given rise to prevent diseases that may occur due to unhealthy consumption of seafoods. In order to consume high quality of seafoods, consumers need to be knowledge of the selection of high quality seafoods. To protect seafood borne diseases; the contamination from seafoods to consumers and also from consumers to seafoods can be avoided. For this purpose the transmission of microorganisms should be prevented from seafoods. The necessary measures should be taken as soon as possible to ensure the consumption of high quality of seafoods. The importance of engineering education is very important for avoiding seafood borne diseases and also it is thought that diseases can be prevented by applying good hygienic conditions and applications such as processing, cooking, packaging, storage etc. In this engineering education; the importance of storage conditions in terms of the quality and shelf life of the seafoods should be emphasized by the fisheries engineers. Fresh and processed seafoods should not be kept together and the importance of storage for the seafood quality should be given to consumers. The education about the quality of seafoods should be also given to the consumers in order to raise the awareness about freezing storage such as frozen in a small portions, thawing techniques of frozen fishery products, the mistakes to be applied in thawing process accelerating microbial development, cooking fresh and frozen-thawed fish products, preventing contamination during processing and the mistakes which are applied in the practice of seafoods can be increased diseases and effected on human health.

Keywords: Education, consumer, seafoods, quality, food safety

Project Collaboration Qualities And Project Success: Moderating Effect of Knowledge Integration Capability

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Abstract

The significance of achieving specific goals and objectives lies with the ability to attract and accomplish projects successfully in organizations. Collaborative efforts in project based industries and organizations are increasing to create value for the customers. Literature reveals that collaborations and co-creations lead to certain challenges and complexities. The objective of this study is to explore the moderating effect of knowledge integration capability on relationship between project collaboration qualities and project success. This study used survey questionnaire to collect data using stratified sampling technique from 500 participants of Telecommunication sector and Hospitality sector. Findings show significant positive relationship between project collaboration qualities and project success. In addition, moderation of knowledge integration capability exists on the relationship between project collaboration qualities and project success. This study implies that if project collaboration qualities are practiced adequately and knowledge integration capability of collaborators is highly skilled, it provides expert workforce which led towards the project success.

Keywords: Project collaboration qualities, knowledge integration capabilities, project success

Application Proposal for Transferring Lecture Notes to the Internet Media

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Abstract

In this study, an application example has been made about transferring these grades to electronic environment in order to provide easy access to course notes for students in Ege University, Ege Vocational School Telecommunication program. Classic education is starting with board, pencil, paper. Then lecture notes was supported with software as Word, Power Point and so on. And They transferred to virtual drivers or cloud systems. Thinglink, Edpuzzle, Draw.io and similar programs enable students to access lecture notes interactively. In this way, students can easily access lecture notes, old exam questions, videos and similar course materials from mobile phones, tablets and computers. As a result, the relatively low level of success that vocational students, rather than reading a book or lecture notes, students are expected to work more interactively outside the class with activities such as question solving, watching videos and playing games.

Keywords: Vocational education, higher education, learning environments. learning with game

Impact of 3D Printing and Additive Manufacturign Technologies in Engineering Education

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In the era of digital engineering, concepts such as IoT, Additive Manufacturing, Big Data, Cyber Security, Robotic and automation, and Industry 4.0 come to the fore. The adoption of engineering approaches suitable for the digital age developed in engineering education was inevitable. Digital manufacturing technologies, which we can define as 3D printing or additive manufacturing, have been involved in engineering education in recent years. In this study, applications and effects of 3D printing and additive manufacturing technologies in engineering education are examined. Particularly effective in understanding conceptual designs, innovative manufacturing and design technologies are used in engineering education. In this study, some application examples about the effective use of 3d printing technologies in industrial design education, engineering design education, machine and manufacturing product development and testing processes were examined. It has been seen that this technology can contribute significantly to future design and product development trainings.

Keywords: Engineering Education, Additive Manufacturing, 3D Printing

Labview based monitoring system applied for virtual photovoltaic power station

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The monitoring system in photovoltaic (PV) power plants is veryimportant to interface the whole system and critical in some cases foranalyzing since it has to be in real time for troubleshooting responses. Thispaper proposes simple and low cost solution of virtual instrumentation toprovide a new technique for real-time instrumentation of the PV panelcharacteristics such as voltage, current and power. The proposed system is basedon NI-Labview environment which has high performance in analysis and dataacquisition applications. The acquisition is made through a current and voltagesensors which are connected with a low-cost data acquisition board. All dataare presented in Labview's interface which provided with a special libraries tosupport exchanging data between the microcontroller and the computer. Theproposed solution presents several benefits compared to the traditionalsolution such as the data can be presented in graphical forms in real time, andability of sending data back again to the microcontroller to control other realactuators as well.

Keywords: SCADA, photovoltaic, mppt, labview

Distance Learning Tools Supporting Flipped Learning

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Abstract

Active learning in engineering education means that the learners are motivated for team work in solving real-world engineering problems during the course modules. The learner can comprehend a topic by actively working on it, either with an instructor or together with other learners as happens in team work. Flipped learning approach aims to increase the interaction between learners and between learners and the instructors by completing the information transfer off-campus. As part of flipped-learning in higher education, digital material is provided to the students, before the lectures. Therefore, this learning method frequently uses distance learning tools such as lecture videos, online tests and discussions. The result of providing a structured pre-class study material is gaining time for more hands-on examples, in-class discussions and group projects. Flipped learning approach strongly shows its advantages in design oriented courses, which are mostly found in the third and fourth year's schedule in the engineering curriculum. Moreover, for the first and the second year courses, which are more oriented in analyzing and understanding concepts rather than system design, flipped learning stays strong as it provides room for instructed peer-study. In order not to hinder its advantages on project oriented learning and team work, flipped learning tools should be able to provide necessary theoretical background and conceptual abstract information. Therefore, distance learning tools, which are used for information transfer in flipped learning should be designed carefully. When used within flipped learning approach, distance learning tools are primarily responsible for i. building motivation towards the lecture, ii. assessing pre-knowledge of the learner in that topic, iii. transferring the conceptual ideas related to the topic. In this work, distance learning tools for flipped learning approach and their performance in these three aspects are investigated for particularly electronics engineering courses.

Keywords: Flipped learning, engineering education, project oriented engineering education, electronics engineering education

Improvement of Operational Problem Solving Skills of Marine Engineering Students via Simulator Technology

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Abstract

Marine engineering officers are often challenged with unexpected malfunctions, errors, and many other problems on-board a ship. These faults occur frequently due to the continuous operation of merchant ships. In order to avoid interruption of trade with ships, faults must be rectified as quickly as possible. In addition, rapid and effective response to failures is important for the availability of the systems. Problem solving techniques should be known in order to prevent failures effectively and to take necessary measures for future breakdowns. This paper investigates a full mission engine room simulator based operational problem solving skill improvement approach for marine engineering students. In the case study, they were selected among the students who have completed their long-term shipboard training. The selected students were taught practical problem solving methodology. Before and after the teaching, students' approaches to problems were evaluated in engine room simulator. The results of the cases have been demonstrated and discussed accordingly in the relevant sections.

Keywords: Engine room simulator, operational problem solving, marine engineering, simulator exercises.

A situational awareness assessment to marine engineering students integrated with engine room simulator exercises

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Abstract

Lack of situational awareness of the ship crew is one of the major problems in the maritime industry. Since the shipping operations mostly consist of routine and repetitive tasks, situational awareness can be decreased dramatically on-board a ship. According to the accident causation reports, lack of situational awareness greatly increase the probability of human error, which is the most dominant factor leads to the ship accidents. Although the numerous countermeasures taken by International Maritime Organization (IMO), recent studies revealed that the frequency of ship accidents have been slightly declined in the last decade. However, they continue to happen in forms of collision, grounding, capsizing, flooding, fire in the engine room or man overboard situations. At this regard, this study examines marine engineering students' situational awareness through engine room operations. In order to establish an effective training approach, a full mission engine room simulator is taken advantage as a significant training instrument. The paper contains comparative results and discussions of the students' performance elaborately.

Keywords: Maritime education, engine room simulator, situational awareness, human factor, human error.

An Automatic Grading System for Programming Assignments in Higher Education

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Abstract

The number of university students in Turkey is increasing rapidly in recent years. Due to the increasing number of students, it is getting difficult to plan education and training activities; thus, more teaching staff and physical resources are needed. The faculty members spend reasonable time to grade each and every assignment and sometimes they have to put in a lot of effort under the burden of hundreds of assignments that need to be graded. Therefore, the feedback given to the students by the instructor is annoyingly prolonged, and these periods begin to exceed the reaction time required for learning. Therefore, the students are dissatisfied with this compelling process, which causes disappointment and frustration. However, it is possible to reduce the labor and physical resource requirements by using the new information and communication technologies (ICTs) in assigning and evaluating assignments. In this respect, GitHub Classroom is the cutting-edge technology that has been widely used in educational institutions worldwide for the distribution and collection of homework assignments. In this study, it is explained how to build an automatic grading system on top of the GitHub Classroom system, which is traditionally used for distributing and collecting programming assignments. The approach adopted in automatic grading is a mechanism that is similar to that of the unit testing (a type of software testing), which is a subfield of software engineering. The study also introduces the required and desirable criteria that a programming assignment must meet in order to be auto gradable. The implementation of such automatic grading system will not only reduce the workload of the instructor, but will also provide rapid feedback to students, which facilitate their learning process. Motivated by this rationale, the main purpose of this study is to introduce an automatic grading system for programming assignments, which can be used in programming courses in higher education. For proof of concept, the proposed automatic grading system was used in two different programming courses at Department of Computer Engineering in Anadolu University. The Apache Maven, a build automation tool, was used to compile and run the programming assignments submitted by the students on a standalone server. Moreover, the script files used for automatic grading of programming assignments are shared publicly at https://education.github.community/t/automatic-grading-script/6940 for the benefit of the education community.We believe that the system introduced in this study will make the educational activities supported by the GitHub Classroom more prevalent among not only computer science, but also social sciences.

Keywords: Automated grading, situated learning, github classroom, test driven development

The Implementation of Biomimicking and Biodesign Education for Faculty Members Studying in Architecture/Engineering Departments

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Abstract

The project “Biomimicking and Biodesign education for academicians in Architecture/Engineering” is supported by a special project call of The Scientific and Technological Research Council of Turkey (TUBITAK). TUBITAK 4005 aims to develop faculty members’ knowledge and skills necessary for their teaching specialties in order to arouse their students’ interest and curiosity, motivation in innovative approaches. These “innovative” approaches may be new approaches, strategies, methods and techniques for solving problems encountered in higher and post graduate education. In this context, the research team planned eight days Biomimicking and Biodesign training for faculty members studying in Architecture/Engineering departments. This training will be achieved with 30 participants in September 1-8, 2019 in İzmir. The training schedule included classes such as biomimicking and biodesign-oriented thinking process, instructional design or use of innovative ideas and technologies in education (Edmodo, Kahoot, 3D modellig, etc). Finally, the faculty members were expected to implement what they learned and to prepare their own course materials. This presentation aims to indicate the implementation process of Biomimicking and Biodesign training and to reveal preliminary results of the evaluation of the activities, which was revealed in the training. This study is designed as a qualitative study. The data will be collected with the participant information form, Biomimicking and Biodesign awareness questionnaire, the activities’ summative evaluation form, course observation form, researchers journals and semi-structured interview form. The presentation will include pictures of the implementation process and the evaluation of the training.

Keywords: Academician, biodesign, biomimicking, qualitative research.

Enhancing computer engineering students' learning: Pedagogical implications for logic design course

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Abstract

In recent years, graduates of universities are expected to be successful in their courses as well as gain personal qualities such as leadership, flexibility, cooperative work ability and emotional intelligence. This situation reflects the pedagogical approaches in higher education and brings about the use of various technologies. Thus, it can be observed that various approaches such as ill-structured problems, project based learning, formative assessment, and team work were used; and different technology-supported environments such as blended and mobile learning, MOOCs and flipped classrooms are utilized. However, the idea that technology improves learning outcomes by itself, which ignores the pedagogical design, brings along a problematic approach. In higher education, it has been observed that many research efforts focusing on technological infrastructures have had problems in ensuring continuity, and adoption of these technologies by students. Therefore, it is crucial to focus on the course design to integrate technology with teaching-learning processes effectively; and also to determine the positive and negative aspects of the applied course design from the perspective of the students.

Based on these arguments, in this study, a course design has been developed and applied with the aim of improving the performance of computer engineering students in logic design course. It is also aimed to discuss pedagogical implications based on the feedbacks of the students by taking their opinions to increase the efficiency of the course. We focused on this course because it is one of the core courses studied at different engineering programs. The proposed course design is supported by digital open courseware such as slides, laboratory experiment sheets, experiment videos, assignments, projects and examples. In addition, a learning process, in which students develop projects as a team, provide group and individual reflections about this process, and evaluate each other and themselves with self and peer assessment forms, is designed.

The study is conducted at a public university in Turkey with computer engineering students by following a mixed methods design. In the quantitative part of the study, pretest-posttest control group experimental research design is used to analyze academic achievement of students. Student grades are collected from an achievement test including open-ended questions. Also, students' views and satisfaction levels are examined with a survey. In the qualitative part of the study, data are collected by focus group interviews to include students' experiences and opinions about the design of the course. In addition, based on the students' views on different components of the course design, implications to improve the learning experience of the students in the following years are presented.

Keywords: Computer engineering education, logic design, digital open courseware, academic achievement.

A Software Prototype for Collecting Meta-Data from Academic Databases

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Abstract

Large volumes of publications are listed in online academic databases. Despite the volume of the data, researchers are able to browse through journals, book chapters, and proceedings to obtain relevant resources. The use of metadata is an essential step to locate more specific results and facilitate such an inquiry. Metadata might be defined as a set of information that describes the data and involves keywords that help to label documents and summarize ideas. For academic researchers, metadata has been a useful asset while conducting systematic literature reviews. The use of publication metadata has been an emerging area of interest in Informetrics and Scientometrics. Informetrics studies help academic researchers and students to explore the publication metadata to identify emerging themes and topics. For engineering education, it could be argued that the velocity of change in themes has become more evident over the last decade, along with the introduction of Industry 4.0. Various researchers describe this phenomenon as an industrial revolution that brings along new problems, challenges, methods, and tools. In this context, the analysis of publication metadata in engineering disciplines might prove useful to reveal the key topics and emerging trends. On the other hand, an obstacle for such analyses is the intensive effort required for data collection. In our study, a software prototype (developed with the use of C# and Selenium) is introduced to compete with this problem. The software proposed helps to collect publication metadata and DOI identifiers from the academic databases: Ebscohost, Springer, Taylor & Francis, and ScienceDirect. Moreover, the use of data collected through our prototype will be presented.

Keywords: Informetrics, academic databases, metadata collection, software automation