Towards University-Business Cooperation – determinants, stimulants and forms

Iga Rudawska
Faculty of Economics and Management, University of Szczecin, Poland
igita@wneiz.pl

Joanna Kowalik
Faculty of Economics and Management, University of Szczecin, Poland
kowalik.joanna@wneiz.pl

ABSTRACT

The idea behind university-business cooperation (UBC) is to create various ties and relations in order to exchange and transfer knowledge between the parties. The growing public interest placed in UBC is built on the assumption that it impacts on the employability of graduates and contributes to teaching and learning improvements. Many international projects (HEGESCO, DEHEMS, EMCOSU) support this assumption, delivering evidence that career success depends on the linkages between academia and business world.

Therefore, the purpose of the work is to reveal the several external and institutional factors that determine UBC and shape its nature. Moreover, the authors aim at discussing the barriers on the path of turning academia towards practice. Finally, possible modes of UBC will be presented.

In order to complete the identified tasks desk-research has been applied. It covers literature review and analysis using scientific data bases like Web of Science, Ebsco and Proquest. Moreover, discussion is based on the case study – of one of the running project that is being conducted at the University of Szczecin.

Keywords: university-business cooperation, entrepreneurial university, innovation systems, competitiveness, higher education sector

Introduction

The EU „Europe 2020” strategy talks of smart, sustainable and inclusive growth, where an important role is assigned to active cooperation between universities and the business sector for the purposes of maintaining the Community’s competitiveness (European Commission, 2010). Within this perspective, numerous modern higher education institutions (HEIs) should pursue a better responsiveness to the changes occurring around them, particularly in the labor market. The compatibility of curricula with labor market needs, and thus increasing the graduates’ employability, is today becoming a requirement.

One of the manifestations of universities’ efforts to adapt to the requirements of a competitive market is university-business cooperation (UBC). Despite the clear growth in interest in this cooperation observed in the 21st century, this phenomenon is not a completely new one. In 1993, Nelson described it in terms of an innovation system (Nelson, 1993), and a year later
Gibbons’ team pointed to it as a new mode of knowledge production (Gibbons et al., 1994). UBC has also been referred to as „the triple helix model” (Etzkowitz and Leydesdorff, 2000).

In turn, the term ‘entrepreneurial university’ was first used by B. Clark in 1998 (Clark, 1998), and nowadays he is considered as the one to have pioneered this concept (Sułkowki and Seliga, 2016). In his research, he analyzed a number of case studies of HEIs for their response to the signals received from and challenges posed by the surrounding reality. On this basis, he devised five characteristics of an ‘entrepreneurial university’ organization. These are: a strong central steering and leadership core, diversity in the funding base, an expanded development periphery, an integrated entrepreneurial culture and a stimulated academic heartland. (Clark 1998). This term is close to the concept of a ‘vibrant university’, as well, which is defined as one that constantly revives environments of experience and involves, supports and motivates all university participants (i.e. the authorities, staff, students and PhD students, as well as surrounding entities) to undertake creative and entrepreneurial initiatives (Baran and Bąk, 2016).

The Third Generation University (Makiela, 2017), as this model is often referred to, puts an emphasis on the need to change the management process. It has a decisive impact on the university’s innovation and entrepreneurship processes that are aimed at commercializing research results. Therefore, cooperation with the surrounding world, particularly its business side, becomes an imperative. At the same time, such cooperation is an answer to demographic and cultural changes (including multiculturalism) and labor market globalization.

The purpose of the work is to reveal the rationale behind the idea of UBC as well as the framework conditions and sectoral key drivers that determine UBC and shape its nature. Moreover, the authors discuss the destimulants of turning academia towards practice. Finally, possible forms of UBC have been presented.

The rationale behind UBC

The idea behind university-business cooperation is to create various ties and relations in order to exchange and transfer knowledge between the parties. The growing public interest placed in UBC is built on the assumption that it impacts on the employability of graduates and contributes to teaching and learning improvements. Many international projects like HEGESCO, DEHEMS, EMCOSU support this assumption, delivering evidence that career success depends on the linkages between academia and business.

Evidence to the assumption that UBC contributes to lifting student competences and graduate attractiveness in the labor market was provided by the HEGESCO project (Allen at al., 2011). The studies on a large group of over 43 thousand graduates proved that their professional success and careers were closely linked to their alma mater’s cooperation with its surrounding social and commercial environment. The opportunity to demonstrate professional experience (in the form of a record of practical placements and traineeships in enterprises), a stronger motivation and talent management skills are the outcomes that students involved in UBC projects during their studies can count on. Nevertheless, the conclusions drawn from this project were not optimistic: while almost every entrepreneur claimed that the practical orientation of university curricula was a must, only one in ten academics shared this opinion (Pavlin and Svetlik, 2009, p. 65).

A similar message was conveyed by research reports based on the long-term DEHEMS project, which covered the process of graduates entering the labor market and which subsequently followed their professional paths (Dehems Project, 2015). Problem-based learning, practical placements and student mobility and internationalization were found to increase postgraduate
employability. Moreover, the research carried out within the DEHEMS consortium identified career success factors and influencing factors. The former group included satisfaction with one’s work, career development opportunities, job security, compatibility of the graduate’s qualifications with those expected by the employer, work autonomy and work-life balance. The latter group included the graduate’s earlier professional experience, the type of their course of study, curriculum, teaching methods, their conduct in the course of their study, their country of origin and the characteristics of their position and of the employer. The general conclusion of this research was, however, that employers, trade unions and students alike voiced the expectation that universities should adopt a strategic orientation towards participatory management. Within this perspective, cooperation with various surrounding stakeholders is expected and desirable. It should be based on trustful relationships, public finance stability and institutional leadership promoting common research (Borrell-Damian et al., 2014, p. 40).

Similar conclusions were drawn by the researchers participating in an international consortium of Bulgaria, Hungary, Poland, Slovenia, Spain, Italy, Russia, Croatia and the Scandinavian countries. They studied a total of 397 businesses in the period between November 2013 and June 2014 (Emcosu Project, 2015). The analysis of their results revealed the existence of three approaches to UBC. The first one was related to support for the development of students’ skills and professional careers by: cooperating with academic career services centers, entrepreneurs’ participating in the work of alumni clubs and societies, and practitioners’ contributing to the teaching process (by participating in developing the curricula, in lectures and in research). The second one was related to strategic cooperation in respect of management, and could take the form of practitioners’ involvement in HEI boards, or scientists’ involvement in the supervisory boards of enterprises. The third approach was oriented towards inciting innovation and creativity on both sides of such cooperation. This could take the form of operating business incubators, creating spin-offs and developing new businesses (Palvin, 2016, p. 31–32). The reports published by the EMCOSU researchers supported the assumption justifying university-business cooperation that is based on mutual benefits and knowledge transfer between the education sector and the business sector.

**Framework conditions for UBC development**

University-business cooperation is never a single process; instead, it is a collection of interactions of high complexity and diversity. It is determined by a number of macro-scale social and institutional variables. This is first and foremost a question of the general framework for action as set forth by legislation and sectoral regulations, characteristic of the given country and reaching back to the given nation’s history and culture. Also, the role of institutional support programs such as incentive schemes, public financing sustainability and awareness-raising actions, cannot be disregarded (Röigas et al., 2014, p. 5). Bearing in mind the broad spectrum of UBC stakeholders, it appears to be of special significance to be able to shape the institutional awareness by promoting the cooperation concept itself, informing the parties of the benefits to be derived from the merging of the scientific and business worlds, and reinforcing the willingness to share knowledge. The last of these is strongly influenced by the level of one’s awareness of how significant social ties are, and by the level of the system change leaders’ trust and commitment. The willingness to share knowledge is also dependent on the organizational culture of the particular UBC stakeholders.

Another important element of the framework conditions for UBC development takes the form of such intermediary structures as the National Center for Research and Development or the
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Polish Agency for Enterprise Development. The quality of their work has an impact on the reduction of information asymmetries and transaction costs related to every deal.

Last but not least, UBC is affected by the compatibility of knowledge supply and demand, market demand and technology development and cultural attitudes towards industry-science relations (Polt et al., 2001).

Key drivers and barriers of UBC

According to the Community Innovation Survey that covered data from 14 European countries, enterprises must have a certain level of capabilities to enter into cooperation with higher education institutions (Rõigas et al, 2014, p. 3).

The most frequently cited stimulants of UBC from the point of view of enterprises are:

- the development of R+D measured by the scope of research in various areas,
- the structure of the enterprise sector, namely the ratio of small and medium-sized enterprises (SME) to large corporations, including international ones,
- the intensity of intra- and intersectoral competition,
- the enterprises’ absorption capacity measured by the effectiveness of innovation management,
- the scale of the enterprises’ innovation depending on the stage of the innovation cycle.

On the other hand, from the point of view of the science sector the level of cooperation with the business environment is affected by:

- the development of R+D measured by the number of patents,
- scientific excellence measured by the quality of publications and the reputation of the grants obtained,
- the structure of the scientific disciplines represented by the given HEI,
- the capability to share knowledge, which is also affected by personal qualifications, the personnel’s skills and the methods by which science is financed,
- the type of HEI (e.g. university, technical university, research institute).

The aforementioned EMCosu project helped to identify three groups of barriers to the development of UBC. Those were: barriers related to the intensity of bureaucracy, barriers related to limited resources and barriers related to differences in the organizational culture (Emcosu Project, 2015). The first groups of barriers originated from the complexity of procedures and the growing amounts of required documentation on both sides of the relationship. The second group of barriers was mainly related to HR and financial shortages. The third group of barriers resulted from differences in communication, time management and values.

Types of university-business cooperation – a case study of the „CREATIVE 2018” Project

This article discusses a case study of university-business cooperation using the example of one of the competitions carried out under the program of the Minister of Science and Higher Education. The competition envisaged co-financing of measures undertaken within three domains, namely: „Scientific excellence”, „Science for Innovation” and „The humanities for development” (MNiSW, 2018). Its purpose was to support measures contributing to the building of lasting relationships and cooperation between scientific bodies on the one hand and entities from the socio-economic environment on the other. Its originators planned the “Creative 2018” project to last for
21 months, and defined its main objective as “to increase the practical R+D project management skills of 40 young social sciences researchers (including a minimum of 50% of women and a minimum of 5% of disabled persons) and to commercialize their knowledge by organizing a comprehensive training and traineeship program adapted to the needs of the young scientists and the needs of the surrounding socio-economic environment entities of the West Pomeranian region”, corresponding to the first two domains of action.

Young members of the University’s academic staff (up to the age of 35) representing social sciences, i.e. economics, management, finance, political science, sociology, psychology and law, and willing to continue their career at an HEI, made up a direct target group of 40 members. Each project participant was responsible for drawing up an individual program for traineeship in a reputable enterprise from the West Pomerania region that had earlier expressed its readiness to join the project. Such traineeship programs where then assessed by the Competition Jury composed of highly-regarded members of the University’s academic staff, as well as chairpersons and directors from selected companies. The purpose of this cooperation was to establish ties between the academic environment and business.

As part of this cooperation, training courses for the participants were planned in order to improve their skills and shape their future professional career paths. The project contributed to the exchange of views and experience between the University and business, allowed for a confrontation with the commercial practice and facilitated future relationships between the scientific community and business, thus bringing mutual benefits. In the competition, the participants were able to show the skills they had acquired by preparing their individual traineeship program to be implemented in the enterprise of their choice. As a result, the employer had the opportunity to choose to use the ideas of the ambitious participant, add his or her own vision to it and organize the young scientist’s working time for a period of 6 months.

In his work, A. Poszewiecki proposed the following classification of university-business cooperation forms (Poszewiecki, 2010):
- joint supervision of PhD and Master theses based on cooperation between HEI and business representatives,
- lectures delivered by business representatives delegated to the HEI,
- financial support offered by enterprises to academic staff members,
- creation of their own enterprises by academic staff members,
- joint conferences, publications,
- opportunities for business representatives to further their education.

Other researchers, on their part, (Pavlin, 2016; Röigas et al., 2014) recognized the following as the main forms of UBC: employee mobility, student mobility, joint R+D, commercialization of research results, practitioners’ participation in the drawing up of curricula, life-long learning such as through courses for practitioners, inter-company training courses, academic entrepreneurship in the form of business incubators and spin-offs, and practitioners’ participation in managing the HEI.

On the basis of the aforementioned types, the authors of this article proposed their own forms of university-business cooperation reflecting the experience gained from implementing the project:
- promoting the idea of university-business cooperation: development by the project team of rules for the recruitment of young scientists for the training and traineeship program, development of rules for the operation of the project’s Competition Jury taking into account the duties, tasks and assessment criteria, development of training and traineeship documentation including young scientist evaluation forms and individual forms concerning the training program, creation of a website for placing promotional and information materials concerning the project;
practical workshop aimed at improving PhD students’ soft skills in creative thinking; the workshop intends to provide a total of 1,920 hours of training to 40 young scientists of the University (48 hours per person) and makes use of the FRIS technique employing self-diagnosis of the participants’ thinking and behavioral styles. This solution is devised to contribute to the merging of theory and practice;

- acquiring partners: thanks to the project manager’s long-term experience and participation in various research grants the opportunity to cooperate with 6 reputable regional enterprises willing to join the program emerged;

- creative work on the individual traineeship program: out of the overall number of individual traineeship programs submitted by the training participants (40 persons), the Competition Jury selected 10 most creative ones that scored the most points; the winning authors commenced program implementation in the enterprises, and received an additional support in the form of 6 hours of coaching sessions;

- planning, implementing and monitoring of 10 traineeships: ultimately, 10 contracts for 6-month paid traineeships were signed with the program partners.

This example of a UBC project demonstrates numerous benefits to be gained. This type of exchange creates opportunities for working out extraordinary solutions and acquiring proven, trained and qualified employees, which as a result will contribute to lasting cooperation between students and enterprises, whereas the ties so established will facilitate both the parties’ commitment to further projects and strengthen their mutual trust for any future purposes.

CONCLUSIONS

The science world is in constant pursuit of development, looking out for new initiatives that provide opportunities for the widening of horizons, the overcoming of barriers and the creating of joint innovative solutions in cooperation with enterprises. Any cooperation consists in offering mutual support in ways that ensure benefits to both the parties. University-business cooperation is first and foremost based on carrying out various sorts of educational training courses and traineeships in reputable companies with a possibility of further developing one’s skills in the given enterprise under stable employment conditions. It can also entail the broadening and improving of knowledge by taking advantage of the operations of enterprises which are, in turn, interested in expanding their own knowledge at the higher education institution. Thanks to their active involvement in the work offered by enterprises, the students and young scientists often acquire practical skills and confront their knowledge with practice. For the enterprises, the students’ knowledge and creativity are added value that may bring favorable benefits supporting the development of their businesses.

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The University-Sponsored Student Business Venture Model

Vusumuzi Malele  
Tshwane University of Technology, Pretoria, South Africa  
vusimalele@gmail.com

Khumbulani MPOFU  
Tshwane University of Technology, Pretoria, South Africa  
myemail@email.com

Mammo MUCHIE  
Tshwane University of Technology, Pretoria, South Africa  
mymuchieM@tut.ac.za

ABSTRACT

The ability to transfer knowledge to solve problems emanating from society and industry is key to economic growth. In this regard, methodologies for entrenching the culture of entrepreneurship and innovation to university students is vital for any education system. This paper, firstly, used questionnaires to explore students’ interest and understanding on entrepreneurship and innovation; then it adopted a problem solving methodology to develop and test a model on how South African Universities of Technology could use assignments to entrench the culture of entrepreneurship and innovation to their students. The findings showed that majority of students were interested to entrepreneurship and innovation. Furthermore, their understand of entrepreneurship and innovation was based on their study level and exposure to entrepreneurship and innovation indicators. When using the developed model, majority was keen to establish business ventures of their own. In general, students have interest and good understanding of entrepreneurship and innovation, and to entrench it on students’ life, it should be part of the students’ curriculum.

Keywords: Entrepreneurship and innovation, student business ventures, problem solving.

INTRODUCTION

About 13.1% youth in the world are unemployed (ILO, 2017). In South Africa unemployment rate decreased to 26.7% in the fourth quarter of 2017 from 27.7% in the previous period. Figure 1 illustrate that the number of unemployed fell by 330 thousand to 5.88 million, of which most of the unemployed people are youth (Moya, 2018). Of note is that as people grow older the level of unemployment gets lesser and lesser.

Unemployment is a crisis and it hurts at any age; but for young people, long-term unemployment is life-scaring phenomenen. The latter solicits for an answer on how or what could be done to solve youth unemployment, of which entrepreneurship and Innovation could be one.
Entrepreneurship and Innovation is known to be the key driver to any country’s economic growth, success and survival (Millic, 2013; Kritikos, 2014). In this regard, the practice of entrepreneurship and innovation should be entrenched to the country’s citizenry in particular the young people. The latter could be the way to address youth unemployment.

The practice of entrepreneurship and innovation provides the ability to transfer ideas and knowledge to solve problems emanating from society and industry. In this regard, in the engineering context, it is important that the training of undergraduate, graduate engineers, novice, qualified engineers, etc have creative skills, potential and ability to solve problems, while practicing entrepreneurship and innovation. The latter could be provided by using problem solving methods or processes to train this engineers. However, Haupt & Webber-Youngman (2018) argues that problem-solving processes tends to focus emphasizes on the quality of the end-products or solutions and disregards the importance of the problem structuring steps. are emphasized.

Against this background, this paper proposes a model that adapts problem-solving method to try and close the gap of emphasizing the problem solving steps while putting effort at producing a solution which could be commercialized. This model is presented as a way of entrenching the culture of practicing entrepreneurship and innovation among engineering curriculum. In this regard, this paper investigated how can South African Universities of Technology entrench the culture of entrepreneurship and innovation to their students. It answered the following questions: (i) Do South African Universities of Technology students understand entrepreneurship and innovation? (ii) Are South African Universities of Technology students interested in entrepreneurship and innovation?

Despite this introduction, this paper briefly describe problem solving as a theoretical framework that guided this study, highlights the adopted methods, and highlights how the data was collected and analysed. Furthermore, the paper discusses how problem-solving method was adapted to develop the proposed model, how that model was tested and what the results were. It concludes by generally pointing out future research work.
PROBLEM SOLVING

Engineering education literature overwhelmingly indicates that traditional curricula propagate linear thinking, which is not conducive to fostering the kinds of thinking needed when working in environments with complex systems (Haupt & Webber-Youngman, 2018). Engineering education adopts and involves applying a consistent, structured approach to the solving of problems.

According Ahmad (2011) advised that solving problems must be approached methodically, applying an algorithm or step-by-step procedure by which one arrives at a solution. In this regard, to begin solving a problem, an individual should firstly recognize and agree that there is a problem, then identify the problem root cause as some problems might have hidden origins.

Problem solving is the process of finding solutions to difficult or complex issues. It is a process whereby a best outcome is determined for some situation, subject to certain constraints. It can be used to develop practical and creative solutions, and to show independence and initiative. (Adams, Kaczmarczyk, Picton, & Demian, 2010; Ahmad, 2011) mentioned that the exist different problem solving models as illustrated in Table 1. The CCMIT teach that these problem solving models are subdivided into two basic types: (i) algorithmic, and (ii) heuristic (https://ccmit.mit.edu/problem-solving/).

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<th>Woods Method</th>
<th>Myrvaagnes Method</th>
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<td>Preparation</td>
<td>Define plan</td>
<td>Define problem</td>
<td>Define the problem</td>
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<tr>
<td>Incubation</td>
<td>Plan</td>
<td>Think about problem</td>
<td>Identify key issues</td>
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<tr>
<td>Inspiration</td>
<td>Carry out plan</td>
<td>Devise plan</td>
<td>Collect/assess information</td>
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<td>Verification</td>
<td>Look back</td>
<td>Carry out plan</td>
<td>Identify assumptions</td>
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<td>Look back</td>
<td>Break problem into parts</td>
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<td>Model sub-problems</td>
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<td>Communicate the solution</td>
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The algorithmic strategies are traditional step-by-step guides to solving problems; and they are best when there is a single path to the correct solution. While heuristic methods are general guides used to identify possible solutions. Of which, the popular heuristic model is illustrated in Figure 2, and known as IDEAL an abbreviation for following steps: (i) Identify the problem, (ii) Define the context of the problem, (iii) Explore possible strategies, (iv) Act on best solution, and (v) Look back and learn.

In the engineering context, practicing engineers are hired, retained, and rewarded for solving problems, so engineering students should learn how to solve practical problems (Jonassen, Strobel, & Lee 2013). There are different methods of teaching students problem solving process, of which Adams, et., al, (2013) highlights but few: (i) Thinking Aloud in Pairs Problem Solving (TAPPS) where problem, (ii) solving process skills are developed through the interaction of the problem solver and a listener, (iii) Brainstorming techniques for idea and solution generation for developing discrete stages of the process, (iv) Gantt charts for planning and implementation and evaluative checklists for evaluation and reflection, and (v) Problem-based learning (PBL) exercises where curriculum is structured as a problem or series of problems, as opposed to a systematic presentation of subject content. Any PBL activity is made up of different components such as: setting the
problem scenario, forming the teams, providing support, and allowing reflection on individual performance.

Figure 2: The IDEAL framework.
Source: (https://ccmit.mit.edu/problem-solving/).

Since practical engineering problems are substantively different from the kinds of problems that engineering students most often solve in their lecturer rooms; therefore, using PBL could help to prepare engineering students to solve practical problems.

RESEARCH STRATEGY

According to Saunders, Lewis, & Thornhill, (2012) pragmatics recognise that there are many different ways of interpreting the world and undertaking research, that no single point of view can ever give the entire picture and that there may be multiple realities. Pragmatism research philosophy accepts concepts to be relevant only if they support action.

The aim of this paper is to report on the development of the entrepreneurship and innovation model that was validated in an engineering class. In this regard, to implement the pragmatism research philosophy the two prong data collection methods was adopted see Figure 3.

Figure 3, summaries the research design that was adopted to conduct this study. It shows how the two prong data collection methods, namely: (i) survey, and (ii) action methods were used to conduct the study.

A survey method is all about questioning individuals on a topic or topics and then describing their responses. Survey method pursues two main purposes: (i) describing certain aspects or characteristics of population; and/or (ii) testing hypotheses about nature of relationships within a population (Dudovskiy, 2018). Questionnaires and interviews are mainly used in a survey as data collection instruments. In this study, questionnaires were used to collect data that will attempt answering the following research questions: (i) Do South African Universities of Technology students understand entrepreneurship and innovation? (ii) Are South African Universities of Technology students interested in entrepreneurship and innovation?
Action research is an approach in which the researcher and the research participants collaborate in the diagnosis of the problem and in the development of a solution based on the diagnosis. In this regard, focus group discussions were used as data collection tool that aimed at capturing students experiences and views after using the model developed with the realization of the students understanding and interest of entrepreneurship and innovation. Group discussions were conducted with the participation of 5 to 7 people per group.

**Figure 3: The study research design.**

**RESULTS**

**Data Collection**

For this study, a plan was to draw a total sample of 1048 students from six South African Universities of Technology (UoT). Ethical clearance requests were sent to six UoTs; of which, only five gave approval for data collection while no response was obtained from the other one.

After receiving ethical clearance, the questionnaires were distributed to a total of 980 science, engineering and technology students from the five UoTs; of which 950 were returned. Of the 950 returned questionnaires, 886 were unspoiled and 64 were spoiled. As illustrated in Figure 4, of the 886 unspoiled questionnaires, 405 were from Diploma students, 302 Bachelor of Technology (BTech), 140 Masters of Technology (MTech) and 39 were Doctor of Technology (DTech). Furthermore, of the 886 participants 57% were male while 43% were female; and majority were the latter numbers were further subdivided into gender and age distribution.

**Data Analysis**

The distributed questionnaires were structured in a way that they answer the two research questions. The questions were drawn to understand entrepreneurship and innovation.

(i) **Do South African UoT students understand entrepreneurship and innovation?**

To answer this question, the questionnaires were separated into determining whether students understand entrepreneurship separately from innovation viz entrepreneurship and innovation.

Entrepreneurship is a multidimensional concept and the definition used depends on the focus of the research taken (Verheul, et al, 2001:4). Innovation is the process of creating something new of value that has useful application and significant impact upon an individual, a group an organization, an
industry, or a society (Malele, 2017).
Societal and economic changes and challenges gave birth to entrepreneurship and innovation. Entrepreneurship cannot be de-linked from innovation. In this regard, the term or concept entrepreneurship and innovation is the process that leads to the development of new ventures based on the exploitation of new or existing knowledge (Elpida, et. al., 2010). Entrepreneurship and innovation is most often equated and linked to job creation than job consumption.

Figure 5, show the different understanding levels of students in respect to entrepreneurship and innovation. In general, most students, about 76% agreed and strongly agreed that they understand the concept of entrepreneurship and innovation.

Figure 5 is curvilinear and skewed towards students' agreeing and strongly agreeing response that show their understanding of entrepreneurship. As a general observation, while students understanding of innovation increases, so does that of entrepreneurship. Furthermore, despite the fact that most participants were male, the understanding of entrepreneurship and innovation is not gender based but clearly it depends on the study level. This means that the further a student begin to enroll and/or graduate from postgraduate studies, the better their understanding of entrepreneurship and innovation becomes. Malele (2017) argued that such students have a strong potential of...
establishing new ventures, the issues is that they were not adequately training in entrepreneurship and innovation.

(ii) Are South African UoT students interested in entrepreneurship and innovation?
Since students mainly understand entrepreneurship and innovation, then it was deemed proper to investigate their interest on it. Richard David Korb in Chapter One of his book: “Motivating Defiant and Disruptive Students to Learn” refer to the fact that during his undergraduate days his Professor proposed that they should not avoid and stop asking the question why? This was because if they do, they would cease to grow in their understanding of life (Korb, 2012). The question ‘why this’ and ‘why that’ provides individuals with enthusiasm or stimulus of investigating things; this could be described as interest.

Students develop interest and motivation when they are encouraged to explore and investigate new areas and ideas (Kolb (2012). Exploring and investigating new areas and ideas with clear expectations demands self-belief. Van der Lingen and Van Niekerk (2015) said self-belief is a key characteristic of successful entrepreneurs. In other words, self-belief is an ingredient that sparks an interest for entrepreneurship and innovation. In this study, students’ entrepreneurial and innovation interest was investigated (see Figure 6).

![Figure 6: Students’ response on interest in entrepreneurship and innovation.](image)

As illustrated in Figure 6, in general, students agreed with statements that show interest to entrepreneurship and innovation. It indicates that on average students are interested to engage themselves in an entrepreneurial and innovation activity with Diploma and BTech students being more interested than MTech and DTech students. It should be noted that Diploma and BTech are mostly junior students who are mainly in their 20 something years of age. In this regard, the younger people are the better the interest of engaging in entrepreneurship and innovation activities.

Model Development
Adapting from the fact that students had understanding and interest on entrepreneurship and innovation as discussed above, a model known as the University-sponsored Student Business Ventures (USSBV) was developed (see Figure 7). The USSBV comprise four main stages and feedback loop that connects these stages. The stages are (i) ideation, (ii) agreements, (iii) Business Research & Development (R&D), and (iv) Venturing.

(i) Ideation Stage
In USSBVs’ Ideation students do not obtain entrepreneurship and innovation ideas only through research and development, but also allow students to obtain ideas from patent search, community engagement, and intuitiveness (i.e. brainstorming sessions, normal creativity, etc). This intuitiveness will seek to address challenges emanating from students’ environment or communities. Furthermore, the need for employment develops more intellectual opportunities that could be exploited as such these are possible entrepreneurship and innovation ideas.

In the ideation stage, an interactive process is conducted which involves finding the (a) needs (mostly through the methods that are discussed above), and (b) formulating and determining feasibility. An ideation stage is the recognition of opportunities stage for feasible ideas, when found, they go through the agreement stage.

(ii) Agreement Stage
The ideation stage is followed by an agreements or intellectual property rights stage which involves patent registration, signing of agreements of understanding and agreements of exploiting the ideas. These agreements are signed between the students (as potential venture founder or chief executive officers) and the university (as a sponsor). To protect all parties, in a case whereby students obtained ideas from community members such as indigenous knowledge holders or practitioners, an agreement between the student(s), the community member, and university should be signed.

In this stage, the university has to use its policies, assets, and resources to assist students with the development of business agreements. It should be noted that almost all ideas need to go through intellectual protection (IP) process. Some ideas could be protected through other registration...
processes (i.e. terms of reference, memorandum of understanding, etc). Thereafter, the ideas will be taken to the R&D stage.

(iii) Research Development
The research and development (R&D) are at the heart of innovation. Unless R&D is effectively transferred to the marketplace and communities, its benefit to the locality or economy will be limited (Yusof, 2010). The signatories by different stakeholders on (ii) above regarding to the suitable ideas, allow the student(s) and the university (designated personnel) to begin conducting some necessary R&D activities such as idea to product development, business and marketing processes, etc.

The outputs of this stage could either be prototypes or products or services which could then be marketed and demonstrated (or vice-versa) to the: (i) selected target market (i.e. those who suggested ideas and solution was conceptualize for, or selected group which marketing research identified as potential buyers), and (ii) entire potential market (i.e. expansion of buyers). It is at this stage when part of venture capital funding and university funding will be important and necessary because some of the prototypes or products or services will need to be protected through agreements and/or IP protection processes. In this regard, it should be noted that some R&D activities will yield ideas and solutions that might need to be refereed back to the agreement stage for them to protected. For completing such an activity, the USSBV comprise a feed loop that takes care of such issues. Once the necessary R&D activity is conducted, its products or outputs marketed and demonstrated to the targeted market; then, the results of this stage foster the beginning of the venture creation stage.

(iv) Venture Creation Stage (Venturing)
In this stage, the USSBV’s stakeholders strategically form and register an organization that will be used to commercialize the outputs of stage (iii) above. Such a venturing organization will seek necessary certification for the developing, marketing and demonstrating the necessary prototypes or products or services. The structure of the organization will be in such a way that the student(s) will be founding members and perhaps CEOs.

In this stage, most of the agreed venture capital and university funds will be needed because other entrepreneurial and innovation activities should be conducted like further marketing, salaries of new employees, etc. This stage produces more ideas that are feedback, mostly to the ideation stage; however, depending on how they are conceptualized, they could be routed to any stage for further development and exploitation.

Model Validation

IDEAL Framework
To validate the USSBV model, the following question was asked: “Could the USSBV model be capable of addressing students unemployment problems”. Students unemployment is a complex and difficult problem. In the sections above the IDEAL framework was presented as a problem solving process aimed at finding solutions to difficult or complex issues. In this regard, the USSBV was compared to the IDEAL steps to validate whether or not the USSBV could be viewed as potential problem solving model (see Figure 8).

The USSBV ideation stage could be mapped to relate to both the Identify and Define steps of the IDEAL framework. In the IDEAL framework, the Identify step is used to identify the problem and the Define step used to define the context of the problem, while in the USSBV model Ideation is used to identify a potential problem that need to be solved through entrepreneurship and innovation ideas, understand the problem and ideas, then swift for a feasible idea.
The Explore step of the IDEAL framework explores possible strategies, this mapped to the USSBV’s Agreements and R&D stages as they use the idea from Ideation stage to explore feasible prototypes or products or services as the idea’s outputs. In the USSBV’s Agreements and R&D prototypes or products or services will be protected and marketing; this link well to exploring strategies. The IDEAL framework, Action and Lookback steps began to act on implementing the best solution and learn from the process. This relates to the USSBV’s Venturing stage which focus on developing an organization that will certify and commercialise the prototype or product or services that would have been the outputs of other stages. Funding will be needed in establishing the organization and commercializing the prototype or product or services, then stakeholders should take an action of getting the necessary funding from venture capital and university funds. This stage will produce more ideas that are feedback, mostly to the Ideation stage; however, depending on how they are conceptualized, they could be routed to any stage for further development and exploitation.

Model Testing
At Tshwane University of Technology (TUT), Faculty of Information and Communication Technology (FoICT), wireless and mobile communication network module known as Network System IV (code as NSY401T), is offered in the second semester to students registered for the Bachelor of Technology (BTech) in Computer Engineering Systems (CES). The author was a lecturer of the NSY401T from 2013 to 2017. The assessments of NSY401T comprise two major assignments, two semester tests and examination. The assignments and semester tests are used to compute a student’s predicate mark (PM). Examination results are computed as examination mark (EM). The student is promoted if the average of the PM and YM, known as the year mark (YM) equals to 50% and above (i.e. YM = ½ [PM + EM] = ≥ 50%).

The NSY401T assignments were designed (by one of the authors) to gauge the theoretical understanding (assignment 1) and the critical thinking through practical solutions (assignment 2) of the students. The aim of the theoretical assignment was to build the students research skills (i.e. their end product was to produce through systematic literature review, an essay or survey document looking at one of the wireless and mobile communication network topics like 5G). While the aim of the practical assignment was to introduce PBL to students by allowing them to use their NSY401T concepts to identify societal and economic problems and ideas that could such problems. The USSBV model was presented to the students as a PBL method and as a guiding model identifying and exploit the identified ideas either as prototypes or product or services. To achieve the outputs of assignment 2, students were divided in groups of five to six members. The groups were allowed to setting the problem scenario through applying ideation techniques such as patent search, brainstorming etc.
The general observation was that the assignment 2 task allowed students to reflect on the teams’/group performance, enter into the university for exploiting any potential idea which could bring commercial profits. In this wireless and mobile networking ideas that could solve societal challenges were brought forward and reported by different groups to the researcher. However, some students felt that they need to continue with their potential solution and build some models that could support and test the solution workability of their ideas. Of particular importance was a group of five students (comprise of two members employed as school teachers, two unemployed, and one employed as a technician) who used Design Thinking for Educators toolkits (www.ideo.com) to develop a web-based physical science simulation software for the classroom. The simulation was accessed through mobile phones but could allow students to communicate online. The chat was facilitated through an app that uses the ShareIt algorithm. The researcher(s) assisted the students to develop a technical drawing that illustrates the way their simulation works. Furthermore, the researcher helped the students to create the simulation as a proprietary software in which a license fee will be needed for its usage. The main target market for this software was the South African Department of Education. Then the researcher requested the students to submit their work for funding by the university’s funding partners such as the South African Technology Innovation Agency (www.tia.org.za/funding), agency of the Department of Science and Technology or for GAP ICT which is annually hosted by The Innovation Hub Management Company (TIHMC) (http://test.theinnovationhub.com/gap/ict/) subsidiary of the Gauteng Growth and Development Agency (GGDA) which is an agency of Gauteng Provincial Government’s Department of Economic Development (GDED).

At the time of writing this report, the group agreed that the two unemployed students’ will join the TIHMC’s Maxum Business Incubator to further pursue their idea and there three employed will contribute some living allowance as a form of stipend until an incubator or sponsor adopted the idea. In 2017, a follow-up made with the students revealed that they were currently sponsored by an angel investor through a concept called crowdfunding. Unfortunately, the latter happened out of the university premises since the students graduated in 2016 and they did not share the ideas with the university. In this regard, the university should identify and work with crowd or venture investor during early stages. The students’ participation rate to the entrepreneurial and innovation activity was impressive. Throughout the years (2013 to 2017), when students were asked about the inclusion of entrepreneurial and innovation activity in their NSY401T course, on average about 97% of students agreed and strongly agreed that such an inclusion would be beneficial to them. Through discussions, the students pointed out that the activities stretched their think capabilities and afford them an opportunity to be assessed on ideas that could be exploited and help them to foster new companies. In terms of students’ interests towards entrepreneurship and innovation, the researcher concluded that the success rate of students’ ideas is a function of their attitude, motivation, and interests:

\[ \text{ideas success rate} = f(\text{attitude, motivation, and interests}) \]

**CONCLUSION**

This paper was developed from a doctoral study that aimed at developing a model for university-sponsored student business. The main contribution of this study is the methodology concept known as USSBV model that could be used to include entrepreneurship and innovation activities within other education fields curriculum in particular engineering.

In conclusion, the inclusion of include entrepreneurship and innovation activities in the NSY401T curriculum appeared to ignite students’ interest in establishing the joint-ventures with the university. In this regard, students would have addressed their employment insecurities and that of others. A
research on the success of these joint-ventures pose a question for future research. The second aspect that require future research would be to investigation the policies of stakeholders which promote the inclusion of entrepreneurship and innovation activities in engineering curriculum such as exploiting existing patents.

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This paper was developed from a doctoral study that aimed at developing a model for university-sponsored student business ventures. In this regard, we like to thank the Department of Industrial Engineering in the Faculty of Engineering and Built Environment at Tshwane University of Technology (TUT) for allowing that a doctoral study could be conducted under their auspices. We also acknowledge and thank the Gibela Railway Consortium, National Research Foundation and the Department of Science and Technology for their support.

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More Entrepreneurial Life at European Schools – innovative project approach in the development of business skills in academia

Piotr WOŁEJSZA
Maritime University of Szczecin, Szczecin, Poland
piotr@am.szczecin.pl

Bogusz WIŚNICKI
Maritime University of Szczecin, Szczecin, Poland
b.wisnicki@am.szczecin.pl

ABSTRACT

The article is the result of collaboration and research within two projects: MELES (More Entrepreneurial Life at European Schools) realized in 2014-2017 and its continuation named ABC (Academic Business Coach) - MELES 2.0. Both projects are co-financed under the Erasmus+ Programme within the framework of the Action - Strategic Partnerships for higher education. The aim of the article is to analyse the support process for academic entrepreneurship. The main output of the MELES project - the Entrepreneurship Course is discussed and the specific needs of the support for business-oriented students are presented. The support activities include compilation of the Entrepreneurship Advanced Course and individual support provided by the Academic Business Coach (ABC). The description of the ABC’s duties and role in the academic environment is given. The ABC methodology can be regarded as an institutional answer to lack of effective entrepreneurial approach in the system of higher education in Europe.

Keywords: entrepreneurship, academic education, coaching

INTRODUCTION

More and more often, the level of acquired cross-cutting skills, such as entrepreneurship, innovation and creativity, determines the chances of employing graduates. It is this type of skills that is becoming a key asset in the development of private business entities operating in a very competitive market of products and services. Research shows that compatibility of the acquired knowledge and skills with the expectations of potential employers plays an increasingly important role (Fabiańska, 1986). The most sought-after competence is entrepreneurship understood as a way of acting, tendency to take new, risky and unconventional ventures and to show initiatives (Kocór & Strzebońska, 2014). It can be said that entrepreneurship is a novelty of seeking a difference in comparison to what others do, finding more effective ways of operating on the market, striving for higher utility of products and services as well as greater efficiency of management. By its very nature, it is a competitive activity in relation to the behaviour of others (Kortan, 1997). Bearing in mind the above definitions, it can be concluded that entrepreneurship education is primarily a comprehensive process of developing entrepreneurial skills among students.

Introducing an entrepreneurship course into the curricula does not mean that each student participating in classes is supposed to start a company. Enterprise is a much broader term and to be
an enterprising student means to be aware of and pursue new opportunities and interests. Most European students dream about stable full-time employment. They are usually not interested in creating their own companies. The students have to be ready for changes and know how to estimate the risks of decisions in their professional life as well as be aware that starting their own company is one possible career paths. Entrepreneurial attitudes are desirable not only in one's own company but also in companies where students will be engaged as leaders of company projects. That is why it is so important that education in the area of entrepreneurship involves all students from all fields of study and not just business faculties.

We can talk about a relatively new process of supplementing curricula of European universities with courses dedicated to entrepreneurship. The changes seem to be forced by the situation on the labour market and are the result of the analyses of graduates' careers and needs reported by employers. Clearly, the pace and quality of curricula changes in individual countries is different and there is a lack of a coherent strategy in European entrepreneurship education (Lilischkis S. at al. 2015). Such a strategy is very important, because, according to good practices, especially from American universities, courses related to entrepreneurship should be implemented in synergy with the entire ecosystem of supporting the process of creating new companies in a given region or country (Greene P.G., 2016; EC Expert Group, 2008; Kauffman Report, 2006).

This is confirmed by the experience of the authors. Implementation of entrepreneurship courses developed within the framework of the MELES project effectively shapes the pro-entrepreneurial attitude of students, who are motivated by the activities to become more and more involved in real business projects. In each phase of such projects, however, intensive support is needed in the form of coaching and mentoring in various areas and phases of project development.

The aim of the article is to analyze the support process for academic entrepreneurship. The publication is the result of long-term research conducted by the authors in the field of entrepreneurship (Kopczyński at al., 2017; MELES E-book (2017)). In this research paper the authors focused on the desired changes in the systemic approach manifested in various forms and tools of support for business initiatives within the academic environment. The presented analyses are the result of the international projects: MELES (More Entrepreneurial Life at European Schools) conducted in the period 2014-2017 and its continuation named ABC - MELES 2.0 (ABC stands for Academic Business Coach) commenced in 2017 and planned to be finished in 2020. Both projects are co-financed under the Erasmus+ Programme within the framework of the Action - Strategic Partnerships for higher education.

METHODOLOGY OF MELES PROJECT

The main objective of the MELES project implemented under the Erasmus + program is to open a university for cooperation with the environment and introduce a new methodology of teaching entrepreneurship to students in interdisciplinary groups. The MELES project addressed the most relevant topics of the ERASMUS+ programme: entrepreneurship education, innovative curricula and career guidance. The main project outcome - the Entrepreneurship 1 Course programme was developed by a multidisciplinary group of partners and participants. During the 3-year project, 38 meetings were arranged with companies enabling consultations and validation of the course programme. A total of 66 students from 15 countries participated in two summer schools, where our programme was tested. The Entrepreneurship Course was implemented at 5 European Universities and in high schools. The course objectives are:
1. Learn by doing
2. Leave your “comfort zone”
3. Work in multidisciplinary teams
4. Make your own global business
5. Be a leader and think strategically
6. Protect your Intellectual Property
7. Think like a designer
8. Learn from start-ups

Ad 1. Learning by doing is the first and the most important step towards changing of the lecturers and students' mentality. The most important thing is not just learning how to use the skills, but actually using them in real life. A model course contains applied projects in cooperation with companies, particularly with start-ups.

Ad 2. Most European students dream about stable, full-time employment. They are usually not interested in creating their own companies, since they have little or no support from the government, universities and even parents. The students have to be ready for changes and know how to estimate risks of decisions in their professional life as well as be aware of starting their own business as one of possible career paths.

Ad 3. Most innovative products are designed as an effect of teamwork in multidisciplinary teams. Therefore, students should obtain knowledge about the advantages of teamwork and multidisciplinary teams.

Ad 4. In order to do global business and create products that can change the world, it is essential to develop, in our students, the spirit of independence and business approach to implementation of new ideas, to show them the most successful examples of global companies, how they were created and what factors influenced their success. People who believe that their products can change the world are able to develop global companies. Such confidence-based approach should be formed in European students, but it must necessarily be preceded with preparation of an excellent business model and thorough market research.

Ad 5. Leadership is a part of the course programme irrespective of the field of study. Strategic thinking has its applications and can be used under different circumstances. It can be used to develop the strategy and policy for a company, to make business decisions or even to simply understand and estimate a situation.

Ad 6. Students have to understand that intellectual property is one of most valuable assets. Intellectual property is a unique creation and expression of the mind. Whether their business is science, technology, consumer or professional - based, protection of intellectual property, such as trade secrets, is a key factor to succeed.

Ad 7. During the course, students are familiarized with the design thinking methodology. It helps them to understand the needs of customers and, thereby, adjust the product to consumers’ demand.

Ad 8. Learning from start-ups is learning from the experienced people who, step by step, are introducing their ideas into the market. Start-ups are more open than big companies and students who conduct projects with start-ups can observe how their founders work. Most start-ups have extensive knowledge of technical and legal aspects. The knowledge is based on their own experience at different stages of developing the start-up.
Table 1: The roles of ABC

<table>
<thead>
<tr>
<th>Role</th>
<th>Characteristics</th>
<th>Job</th>
</tr>
</thead>
<tbody>
<tr>
<td>Trainer</td>
<td>Knowledge of tools and methods</td>
<td>Teaches and trains based on tools and methods in courses</td>
</tr>
<tr>
<td>Coach</td>
<td>Trained in coaching tools and methods</td>
<td>Helps to define the team, goal, value, vision, mission, idea of the business and idea of the company. Helps to define important questions</td>
</tr>
<tr>
<td>Mentor</td>
<td>With experience in a research field or personal business experience</td>
<td>Shares experience, guides</td>
</tr>
<tr>
<td>Consultant</td>
<td>Strong experience in the business field or with many start-ups</td>
<td>Helps to solve questions in specific fields of experience (legal, managerial, support programmes)</td>
</tr>
<tr>
<td>Networker</td>
<td>Well-connected</td>
<td>Collecting and distributing contacts, organizing events Helps to find people who can answer questions</td>
</tr>
</tbody>
</table>

The MELES Entrepreneurship 1 Course is to help business-oriented students to begin their entrepreneurial projects and, at the same time, is a course, which teaches soft skills like public speaking, leadership, creativity and basics of business design. After such a general course, students and their newly-created teams can decide if they want to set up their first company or not. If the answer is positive, further support is necessary and this need has become the inspiration for conducting of the ABC-MELES 2.0 project, which is a continuation of the MELES project. The proposed support activities include a compilation of the Entrepreneurship 2 Advanced Course and individual support provided by the Academic Business Coach. It can be considered that the ABC (Academic Business Coach) is (see table 1):  
1. An academic teacher (Trainer),  
2. An entrepreneur (Consultant),  
3. A person with contacts at universities and in companies (Networker),  
4. Experienced in using business tools (Mentor),  
5. Implementing coaching methodology (Coach),  
6. Carrying out entrepreneurship/creative/soft skill classes (Trainer),  
7. Dedicated to each department/faculty.  

As an output, the methodology of business coaching at universities will be developed. The new method should be a synthesis of the experience of start-up coaching at partner universities and the experience in coaching of external business coaches. The method should be an approach that academics can use to support start-ups at their home universities as a coach, a mentor or a consultant. The new methodology will be tested during the project and published in a free access handbook in the last year of the ABC-MELES 2.0 project, i.e. in 2020. Implementation of business coaching/mentoring/consulting in the structure of the university is the innovation process.
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Figure 1: Students business development process at universities.

The process is based on the Entrepreneurship 1 Course taken during 1st cycle studies. This course teaches the so called soft skills, which are usually missing in the learning process at universities, particularly at technical universities. It also gives a solid foundation for starting of one’s own
business, but completion of this course does not mean that the students are obliged to start their own business. They can be guided by the Career Office and find their own career path, but those who are willing to set up their own business will probably choose the Entrepreneurship 2 Course, which is also combined with individual support. Students willing to develop their business ideas will be given a dedicated support delivered by the Academic Business Coach. The specific needs of the support will be evaluated based on algorithms like the one presented in Figure 1.

EXPERIENCE AND IMPLEMENTATION PLAN

The main objective of the MELES project was to prepare a comprehensive and coherent educational product which introduces the entrepreneurial skills-oriented courses into the curricula of the institutions that, up to now, had no or small experience with teaching entrepreneurship. The MELES project allowed both students and teachers to develop the skills that had previously been neglected in the curriculum. It also fostered cooperation between higher education institutions, representing different fields of study as well as introduced unconventional and innovative methods of teaching, replacing the traditional approach to the teaching process. The Entrepreneurship course shaped hard business skills such as recognizing the market, preparing a business model, product design, and services based on customer strategy development, attracting investors or protecting intellectual property. In addition, it shaped soft skills necessary for every entrepreneurial graduate, namely: cooperation in multi-disciplinary teams, leadership and presentation techniques. During the project, the curricula have been tested at each of the participating institutions during two summer schools organized within the project. In particular, the latter led to intensive work with students representing all the partner universities and coming from more than a dozen countries around the world. Conclusions and lessons learned in the testing phase were used to develop comprehensive teaching materials in the form of an e-book (MELES E-book, 2017).

As regards the MELES project outcomes, three very valuable achievements should be stressed. Firstly, all students who participated in MELES project activities (summer school, MELES classes) had a chance to meet entrepreneurs and people who set up start-ups. It was a great opportunity to gain knowledge from the experienced people who, step by step, are introducing their ideas into the market. The knowledge is based on their own experience at different stages of developing a start-up and is crucial for people who are at the beginning of their entrepreneur career.

Secondly, some Entrepreneurship 1 Course alumni set up their own companies just afterwards. Two companies grew up rapidly becoming global businesses: https://rifcat.com/vridge and http://meetphoton.com/pl/start/. Next are on their way.

Thirdly, the MELES Entrepreneurship 1 Course was successfully implemented at the pre-academic stage of education. With the support of municipal authorities, the course was delivered to one Technical High School in the City of Szczecin. Classes were enjoyed by students and encouraged some to participate in nationwide competitions for business ideas.

In the ABC-MELES 2.0 project conducted since 2017, the activities developed in the MELES project are developed in accordance with the previously described methodology. As a very important task, during the ABC-MELES 2.0 project, the consortium will develop and test the Academic Business Coaching Training. It has already been approved by the International Coach Federation (ICF). It consists of 60-hour direct workshops conducted by ICF Coaches. Additionally, each coach has to provide 100 hours of coaching, 25% of which have to be pro bono. It can be both individual coaching or team/group coaching. When all requirements are fulfilled, the Certificate for Learning Coaches will be issued by the ICF. It is recommended for proper introduction of the ABC (a new person at university – Academic Business Coach) into the existing structure of the
CONCLUSIONS

More entrepreneurial life at European schools (MELES) project has been created as an answer to an educational challenge, which is lack of effective tools that could be used to increase the social and professional activity of the young generation entering the labour market in order to make full use of their potential for the development of the economy. This challenge created an urgent need to improve the entrepreneurial skills of students in the fields of science and engineering at European universities.

Being an entrepreneurial person does not mean that we obligatory have to set up our business. Some of our alumni already did it. Some of them will do it in the near future. We are in a situation where students have to be ready for changes and know how to estimate the risks of decisions in their professional life as well as be aware of starting their own business as one of possible career paths.

Pure academic education, the essence of which are courses and subsequent exams, is not enough to support the needs of business-oriented students. There is a strong need for dedicated support for students (including purely students and students-teachers teams) who wants to develop their business ideas and start their entrepreneurial life-long journey. The Academic Business Coach can be the institutional answer for such a need. The outputs of the ABC-MELES 2.0 project, planned to be finish in 2020, should establish a tested procedure for wide dissemination of effective ABC assistance at universities in Europe and around the world.

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Main differences between Polish and Spanish students on Financial Markets Trading Capacity Building

Jorge E. VILA BIGLIERI
University of Vigo, Vigo, Spain
biglieri@uvigo.es

Teresa Beatriz SALINAS LOPEZ
University of Vigo, Vigo, Spain
techipisalinas@gmail.com

Livio MISTRETTA
University of Palermo, Palermo, Spain
livio.mistretta@gmail.com

ABSTRACT

This article aims to illustrate our experience in financial markets, with university students of Capacity Building, by taking into account the results of two trading courses in Poland and Spain. Attention will be called to the relevant differences between these students, including trading preferences, risks, and performance and making recommendations for future trading courses to increase their financial culture.

Keywords: Trading, Forex, NYSE, Nasdaq

INTRODUCTION

Nowadays, financial markets and their fluctuations are on top of the worldwide economy and their impact is going to increase in the future. People’s attention is being drawn on these markets, mainly influenced by cryptocurrencies (like bitcoin) and their massive booms at the end of 2017. The number of individual investors is increasing — especially in “Foreign Exchange”, FOREX — since the minimal requirements are a phone, a good internet connection, some spare time (trading is active 24 hours/day) and some techniques like the ones taught in trading courses. Besides, the pyramid-scheme retirement pension systems and the public institutions’ lack of funds, will reduce the retired people income. We need to enhance enough capacity in order to be prepared to uncertain circumstances. Unfortunately, scientific literature shows no previous study of capacity building in finance. This could be due to the fact that when a profitable trading algorithm is discovered, most of the time, authors may not be favourable to share it with the scientific community.

Financial dependence represents a breakdown in developed modern countries. Regardless of their income, people increase living expenses. Spanish financial crisis designates as a clear proof financial disregard. Actually, people's only will is to improve their life conditions, in a way that, for instance, they want to have a better house than their neighbours, but their wages are not rising in decades. As interest rates are low, they ask for credits to finance real estate investments. Government, financial institutions and building companies are in league to feed this behaviour, hence letting Spain achieve the 5th position on a GDP European countries at 2008. American Subprime crises was the detonator.
Refer to Vila Biglieri, J. (2013) for more information and solutions to the periodic crisis on capitalist economic system.

Kiyosaki, R. T. (2014) provides us with some information about the new economic paradigm; “studying as your dad did does not guarantee a good wage. Most of the USA citizens are on the “Rat Race”. This race was created by financial disregarding people asking for huge student loans to pay for their university studies. Therefore, once they get involved into the labour market, they ask for further bank credit to buy a house, a car, and (unnecessary) luxury goods. As “Pinoy Financial Literacy” (2018) implies, luxury goods are material liabilities, which purpose is to take money away from customers. Luxury good can range from a car, a super fancy 4k LCD TV, a tablet, a high-end smartphone or a simple cup of coffee. However, is it wrong to purchase luxury goods? Yes, because they are being purchased with money that could be used to save and invest.

According to Kiyosaki, R. T. (2000), the key to be rich consists in buying assets rather than luxury goods. Assets are designated as investments, which will pay back more cash outflow than the annualized payments.

Assets are going to generate passive income, avoiding financial dependence from your job. Kiyosaki retired at the age of fifty, as he did no longer depend on his job.

This article encourages the idea to make people rich by buying assets on the financial markets. The rules are no different from the real estate ones; buying low and selling high. There is no need to have a lot of money. In this particular case, we analyse two 2018 financial markets courses for university students, one in Spain and the other in Poland.

**The Trader Workstation**

We use Interactive Brokers\(^1\) Trader Workstation\(^2\) platforms. If you are interested in Interactive Brokers (IB) facts, please visit [https://www.interactivebrokers.com/en/home.php](https://www.interactivebrokers.com/en/home.php).

The platform is very professional with many features, like connecting several monitors, much like the traders on the movies. The user interface however contains a huge amount of information, tools and options, which make it a bit unfriendly. However, the friendly trader webpages are based in CFDs\(^3\), unlike IB traders who are registered as real investors with NYSE rights, obligations and guaranties. Since you will share money with your broker, you will need a reliable, low-commission and trustworthy one.

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3 What is a ‘Contract For Differences - CFD’, Retrieved July, 26, 2018 from [https://www.investopedia.com/terms/c/contractfordifferences.asp](https://www.investopedia.com/terms/c/contractfordifferences.asp). A contract for differences (CFD) is an arrangement made in a futures contract whereby differences in settlement are made through cash payments, rather than by the delivery of physical goods or securities. This is generally an easier method of settlement, because both losses and gains are paid through cash. CFDs provide investors with all the benefits and risks of owning a security without actually owning it.
The initial practical explanation takes less than two hours. Afterwards, students can trade on a virtual account with a million dollars on real-time Foreign Exchange, best known as FOREX. There are several videos to learn how to work at the platform; some of them are shorter than 4 minutes, and very popular.

The Financial Market Course

A financial market is a broad term describing any marketplace where buyers and sellers participate in the trade of financial instruments. Investopedia\(^4\) defines financial instruments as assets that can be traded. These assets can be cash, a contractual right to either deliver or receive cash or another type of financial tool, or evidence of one’s ownership of an entity.

The Financial Market course is a mixture of notional and practical knowledge. Notional knowledge is useful, but practical exercises, based on “Learning by doing” paradigm are the capacity building course engine. After two hours of explanation, students are able to trade in paper accounts as described on Trader Workstation section.

Notional knowledge includes several kind of investments, from real state to the most complex financial issues: option derivatives, most known as “put” and “call” options.

Call Options

By call\(^4\) the buyer obtains the right to buy an asset (called underlying asset) at a fixed price within a deadline. Some further examples in Table 1 will be more elucidating. If Apple shares are interchanged at $190.98 (Last price), Commissions depend on the Exchange where the operation is done. Usually they are between $1 to $3. The next examples are simplified and exclude commissions to make the concept clearer.

Call Example (Buyer point of view or Long Call)

Buying an Apple Call option within the deadline, in August 03, 2018, at a fixed price of $172.5

Ticker: AAPL

Strike (price to buy the Call right at the expiration date): $172.5

Expiration date: August 03, 2018

NASDAQ notation: AAPL NASDAQ.NMS Aug03’18 172.5 CALL

Premium (market price to pay to acquire the right in this moment, or ASK price): $18.95/right

Total purchase cost (each instrument has 100 rights): $18.95x100=$1.895 + commissions

Break-even point (expiration date AAPL price to have zero profit): $172.5+$18.95=$191.45

(We earn money when AAPL expiration date price are greater than $191.45)

Long Call Explicit Value\(^5\): (Break-even point minus AAPL share price): $191.45-$190.98= $0.47

Call Example (Seller point of view or Short Call)

To sell: AAPL NASDAQ.NMS Aug03’18 172.5 CALL

\(^4\) Retrieved July, 30, 2018 from https://www.investopedia.com/terms/f/financialinstrument.asp,

\(^5\) This value is also known as “smoke”. Some traders say they get rich because they sellsmoke>>, like in the “The Wolf of Wall Street” movie

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Premium (market price to sell the Call right in this moment, or BID⁶ price): $18.70/right.
Commissions: $1 to $3
Total selling income (each instrument has 100 rights): $18.70x100=$1.870 – commissions
(To make easier the figures, we will exclude commission cost)
Break-even point (expiration date, AAPL price will have zero profit): $172.5+$18.70= $191.2
We earn money when the AAPL expiration date price is under $191.2
Short Call Explicit Value (Break-even point minus AAPL share price): $191.20-$190.98= $0.22

The BID size (889) means the number of contracts waiting to be purchased and the ASK size (186) means number of contracts waiting to be sold. The difference between these two means there are more people willing to sell, who can generate a selling pressure. Nevertheless, all options prices are related to the underlying price, time to expiration date, volatility, interest rates, dividends, etc.

Put options
By put option the buyer obtains the right to sell some asset at a fixed price, within a pre-established deadline.

Put Example (Buyer point of view or Long Put)
To buy: AAPL NASDAQ.NMS Aug03'18 172.5 PUT
Premium (market price to pay to acquire the right in this moment, or ASK price): $0.25/right
Total purchase cost: $0.25x100=$25 + commissions
(To make easier the figures, we exclude commission cost)
We will earn money when the AAPL expiration date price is under $172.50-$0.25=$172.25
Notice that this is very unlikely to happen, as Apple shares price is $190.98, makes it very difficult to go lower than $172.25. This is the reason why the Long Put is so cheap.
Long Put Explicit Value (Break-even point minus AAPL share price): $172.25-$190.98= -$18.73

Put Example (Seller point of view or Short Put)
To sell an AAPL NASDAQ.NMS Aug03'18 172.5 PUT (Short Put)
Premium (market price to sell the Call right in this moment, or BID price): $0.24/right
Total purchase cost: $0.24x100=$24 + commissions
(To make easier the figures, we exclude commission cost)
We will earn money when the AAPL expiration date price is under $172.50+$0.24=$172.26
Notice that this is very unlikely to happen, as Apple shares price is $190.98 makes it very difficult to go down $172.26. This is the reason why the Short Put is so cheap.
Short Put Explicit Value (Break-even point minus AAPL share price): $172.26-$190.98= -$18.72

Table 1: Financial Instruments, relevant information.
Source: Interactive Brokers TWS, 21:59 hours on July, 27th

<table>
<thead>
<tr>
<th>Financial instrument</th>
<th>Bid size</th>
<th>Bid</th>
<th>Ask</th>
<th>Ask size</th>
<th>Last price</th>
</tr>
</thead>
<tbody>
<tr>
<td>AAPL NASDAQ.NMS Aug03'18 172.5 CALL</td>
<td>889</td>
<td>18.70</td>
<td>18.95</td>
<td>186</td>
<td>19.50</td>
</tr>
<tr>
<td>AAPL NASDAQ.NMS Aug03'18 172.5 PUT</td>
<td>319</td>
<td>0.24</td>
<td>0.25</td>
<td>17</td>
<td>0.26</td>
</tr>
</tbody>
</table>

⁶ BID price already exist because in order to buy a call option at a given moment a call seller is needed. The same is true for put options
The National Association of Securities Dealers Automated Quotation, best known as NASDAQ, is a relevant New York Stock Exchange (NYSE) system, which involves over 4,000 “securities”\(^7\).

Electronic financial markets are ruled by algorithms with a common objective; move prices to close more financial interchanges between sellers and buyers as fast as they can. Brokers should be close to the trade computers because a millisecond can be the difference between a profit and a losing operation. As the algorithm knows the buying and selling orders at a given moment, it can increase the price or decrease the financial instrument price to close more transactions. Sometimes, interchange prices are different than ASK and BID prices, but transaction prices should be equal or greater than BID, and equal or lower than ASK prices.

Buyers and sellers send orders to the Broker. If you are buying, Brokers, like Interactive Brokers, find the exchange with the cheapest price possible, and, if you are selling, the most expensive one.

### THE RELEVANT RESULTS BETWEEN POLISH AND SPANISH COURSES

By chronological order, the first course was the Spanish one (SFMC) and it took place from February 23th till March 23th. The final date is known as the “witch hour” because three expiration dates from financial tools are involved at that day. The course was scheduled from 4:00 to 9:00 pm every five Fridays, for total of 25 hours. It was taught at the Economics Faculty\(^8\) at University of Vigo (Spain).

The Polish one (PFMC) was a thirty hours intensive course, starting on June 5th to 8th. It was included as a subject at the Faculty of Economics and Management\(^9\) at University of Szczecin. The students worked on pairs, to discuss different opinions. Better educated individuals, with greater expertise who, in a broad sense, are identified as human capital, contribute to an increase in productivity of other resources\(^10\).

Checking the Polish and Spanish financial markets courses more relevant information by

**Trades and profit per student**

As we can see on table 2, the Spanish course (SFMC) was more active with 10.20 average trades. As a Polish student reached $75,050.32 total profit, Polish course (PFMC) was more profitable than the Spanish one. Polish students are brilliant.

---


Table 2: Financial Market Course highlights

<table>
<thead>
<tr>
<th></th>
<th>PFMC</th>
<th>SFMC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Trades</td>
<td>Maximum</td>
<td>21.00</td>
</tr>
<tr>
<td></td>
<td>Minimum</td>
<td>1.00</td>
</tr>
<tr>
<td></td>
<td>Average</td>
<td>6.38</td>
</tr>
<tr>
<td>Average profit</td>
<td>18,762.58</td>
<td>(953.76)</td>
</tr>
<tr>
<td></td>
<td>Total profit</td>
<td>75,050.32</td>
</tr>
<tr>
<td>SFMC</td>
<td>Trades</td>
<td>1.00</td>
</tr>
<tr>
<td></td>
<td>Average</td>
<td>150.31</td>
</tr>
<tr>
<td></td>
<td>profit</td>
<td>(113.25)</td>
</tr>
<tr>
<td></td>
<td>Total profit</td>
<td>12,456.71</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(1,083.14)</td>
</tr>
</tbody>
</table>

Share analysis per company

Analysing the most trade company, AMZN shares is the winner at both Poland and Spain.

**Poland:**
Most profitable operation was $5.027 on ASML Holdings NV, a company from The Netherlands. The worse investment was $(710.60)$ on Buckeye Partners, L.P., a NYSE company.

**Spain:**
Most profitable operation was $4,785 on Autodesk, a NYSE company. The worse investment was $(440.38)$ on Apollo Global Management LLC Class A, a NYSE investment fund.

**Equity and Index Options**

**Poland:**
Most traded company: NVidia, a NASDAQ company.
Most profitable operation was $73,282.27 on Tesla, a NASDAQ company.
The worst investment was $(2,084.87)$ on G-III Apparel Group, Ltd, another NASDAQ company.

**Spain:**
Not a single trading company on top, because there are several with three trades. Most profitable operation was 3,580.84 on NVidia, a NASDAQ company. The worst investment was $(2,856.50)$ on Qualcomm, another NASDAQ company.

**CONCLUSIONS**

As a matter of fact, we may assume that the comparison in not possible, because the trading period is not homogeneous, but we can only highlight some profitable and unprofitable operations made by
students without any previous financial market knowledge with a few teaching hours, inspiring of the Nike spot: Impossible is nothing.

Another study is related to the American financial markets, particularly in Nasdaq. American companies are quite famous and American brokers are cheaper and professional. An option on Spanish stock market have 6 euros commission price, very expensive, if compared to $1 to $3 dollars of American broker commissions price.

The ‘Learning by Doing’ paradigm, by a motivational scheme, allows us to build capacity on students quickly. Students are involved in a competitive game among their colleagues, doing their best to find profitable investments. Also, they work on presentations based on several investment aspects, addressed to the rest of colleagues to improve communication capabilities.

In countries like Spain, with a huge unemployment rate, financial markets can allow unemployed people to find a way to financial survive with a lot of stress. When you do your first investment on stock market you feel like idiot making the worst trade ever seeing.

We will complete this study with more financial markets courses on countries and locations which give us the opportunity to spread financial knowledge “by doing”.

ACKNOWLEDGEMENT

Our special thanks goes to the Faculty of Economics and Management at University of Szczecin and the Economics and Management Faculty at University of Vigo, for allowing us to spread financial knowledge among students.

REFERENCES

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Web site:

Investopedia Retrieved July, 30, 2018 from https://www.investopedia.com/terms/f/financialinstrument.asp,

Main differences between Polish and Spain students on Financial Markets Trading Capacity building. Jorge E. VILA BIGLIERI, Teresa Beatriz SALINAS LOPEZ, Livio MISTRETTA


### APPENDIX

<table>
<thead>
<tr>
<th>Table 4: Share by trades and profits (Poland)</th>
<th>Table 5: Share by trades and profits (Spain)</th>
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</thead>
<tbody>
<tr>
<td>Companies</td>
<td>Trades</td>
</tr>
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<td>AMZN</td>
<td>4</td>
</tr>
<tr>
<td>AAPL</td>
<td>3</td>
</tr>
<tr>
<td>BABA</td>
<td>2</td>
</tr>
<tr>
<td>CCE</td>
<td>2</td>
</tr>
<tr>
<td>ADS</td>
<td>1</td>
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<tr>
<td>ARII</td>
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</tr>
<tr>
<td>ASML</td>
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<tr>
<td>ATVI</td>
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<td>BA</td>
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<td>C</td>
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<td>CAT</td>
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### Table 6: Options by trades and profits (Poland)

<table>
<thead>
<tr>
<th>Companies</th>
<th>Trades</th>
<th>Average Profit</th>
<th>Total Profit</th>
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</thead>
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<tr>
<td>NVDA</td>
<td>3.00</td>
<td>3,277.00</td>
<td>9,831.06</td>
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<td>TSLA</td>
<td>3.00</td>
<td>24,427.42</td>
<td>73,282.27</td>
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<td>MSFT</td>
<td>2.00</td>
<td>33.61</td>
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<td>NFLX</td>
<td>2.00</td>
<td>503.15</td>
<td>1,236.29</td>
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<td>TWTR</td>
<td>2.00</td>
<td>310.50</td>
<td>621.00</td>
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<tr>
<td>FB</td>
<td>1.00</td>
<td>(124.26)</td>
<td>(124.26)</td>
</tr>
<tr>
<td>GE</td>
<td>1.00</td>
<td>(15.00)</td>
<td>(15.00)</td>
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<td>OIH</td>
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<td>(2,084.87)</td>
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<td>QLDP</td>
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<td>518.62</td>
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<td>GOLD</td>
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<td>5.83</td>
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<td>RYAA</td>
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<td>179.00</td>
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<td>SBUX</td>
<td>1.00</td>
<td>(578.09)</td>
<td>(578.09)</td>
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<td>SEED</td>
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<td>4.00</td>
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<tr>
<td>WTTR</td>
<td>1.00</td>
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<td>210.95</td>
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</table>

### Table 7: Options by trades and profits (Spain)

<table>
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<tr>
<th>Companies</th>
<th>Trades</th>
<th>Average Profit</th>
<th>Total Profit</th>
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<tr>
<td>FI</td>
<td>3.00</td>
<td>202.86</td>
<td>608.59</td>
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<td>FLDM</td>
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<td>GOOG</td>
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<td>KEN</td>
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<td>LEO</td>
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<td>3.00</td>
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<td>MU</td>
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<td>NVTa</td>
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<td>(118.65)</td>
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<td>SLD</td>
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<td>T</td>
<td>3.00</td>
<td>2.34</td>
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<td>TRXC</td>
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<td>(517.67)</td>
<td>(1,553.00)</td>
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<td>MNO</td>
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<td>36.60</td>
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<td>2,395.00</td>
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<td>(2,856.50)</td>
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<td>15.00</td>
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<td>74.85</td>
<td>74.85</td>
</tr>
<tr>
<td>VOD</td>
<td>1.00</td>
<td>(166.23)</td>
<td>(166.23)</td>
</tr>
</tbody>
</table>
A Conceptual Framework for Enhancing the Adoption of E-learning in Engineering education

1Samuel NDUKUBA  
Department of Construction Management and Quantity Surveying, Cape Peninsula University of Technology, Cape Town, South Africa  
ndusam4christ@yahoo.com

2Eric SIMPEH  
Department of Construction Management and Quantity Surveying, Cape Peninsula University of Technology, Cape Town, South Africa  
simpehe@cput.ac.za

3Julius FAPOHUNDA  
Department of Construction Management and Quantity Surveying, Cape Peninsula University of Technology, Cape Town, South Africa  
fapohundaj@cput.ac.za

ABSTRACT  
Purpose: The study is aimed at reviewing existing literature to ascertain the importance of promoting e-learning to enhance a self-regulated learning in engineering education.

Methodology: A literature study was explored to obtain a brief overview of the factors that inhibit the adoption and implementation of e-learning approach in engineering education. An extensive review was also conducted to identify the enablers that promote the adoption of e-learning in engineering education.

Findings: It was revealed that e-learning overcomes the limitation of time and space to create an enabling and convenient learning environment as students use the approach to acquire knowledge at any time and any place via the internet. The systematic in-depth review of literature revealed that there are significant enabling factors that promote that adoption of e-learning.

Limitation: This paper sets a theoretical background relating to the necessity of categorising the factors that engender the adoption of e-learning in engineering education.

Value: The adoption of an e-learning as a pedagogical approach for engineering students will support learning strategies and promote self-regulated learning in engineering education.

Keywords: e-learning, Engineering education, Higher education, ICT, Self-regulated learning.

INTRODUCTION  
Technology-mediated education or e-learning is growing globally both in scale and delivery capacity due to the large diffusion of the ubiquitous information and communication technologies (ICT) in general and the web technologies in particular (Benchicou, Aichouni & Nehari, 2010). According to Vassiliou and McAleese (2014), e-learning services provide opportunity for any person to learn anywhere and anytime. Therefore, its flexibility facilitates a significant shift in the engagement of educational institutions in lifelong learning towards non-traditional learners. In addition, AlShabrawy (2015) and Chitiba (2011) indicated that such flexibility makes it easier for higher education institutions across the world to enrol a lot of students to meet their needs. E-learning thus provides a radical new approach to the educational process for students who are unable to attend on-campus and face-to-face traditional learning. In the perspective of lifelong learning and engineering education, the adoption of e-learning technologies can intensify learners’ motivation, provide better access to information, promote creative secondary communication and thus stimulate learners thinking (Khan et al. cited in Wanyaga et al., 2015). For this reason, higher
education institutions have over the years invested heavily in technology-mediated education in a bid to gain competitive edge and provides convenient education that transcend the boundary of the institutions, defy the constraint of time and geographical location, provides vast access to universal knowledge and reduce the dropout rate to a bearable minimum (Odunaike, Olugbara & Ojo, 2013). According to Ravjee (2007), e-learning emerged across South African Higher Education Institutions (HEI) in the early 1990s. In SA context, e-learning practices appear with new vocabulary, policies and structures, and budgets. Nonetheless, in the 21st century the rapid development of e-learning has put more emphasis on lifelong learning, has created new education opportunities and shown new potential to enhance the teaching and learning experience. It improves the access of educational resources and programs, expands learning opportunities through distance education and reduces the cost in the long run (Lwoga, 2014). E-learning has a potential to enable Africa to achieve Education for All. As Africa faces shortage of trained instructors, trainees, skilled workers, it makes it possible for educational institutions to enlarge the number of learners’ having access to education (Gunga & Ricketts, 2007) particularly engineering education. E-learning is the use of technological interventions for teaching, learning and assessment (Mlitwa & Van Belle, 2011), enabling learners to improve problem-solving skills and empowers educators to disseminate and impart knowledge effectively. In a similar vein, Bagarukayo and Kalema (2015) described e-learning as ICT-enhanced practice in universities ranging from e-mail provision, online journals, and networked libraries, to development of creative software solutions for information management tasks in teaching, research and administrative systems. Hence, Millham et al. (2014) stressed that e-learning is necessary for the enhancement of learners’ performance, engagement, self-regulation, flexibility, interest and motivation. It promotes active participation and self-regulated learning, which enables construction, learning-pace adjustment and gives desired learning outcomes. However, Bagarukayo and Kalema (2015) argued that there is no common approach to it across South African HEIs. There is therefore a concern that the full potential of e-Learning approach is not utilised. Previous studies related to ICT and e-learning in the South African context have tended to focus on the politics and usage of e-learning and challenges to the adoption of e-learning (see Bagarukayo & Kalema, 2015; Ravjee, 2007; Basak, Wotto & Bélanger, 2017). However, limited research studies have been conducted to examine the significant predictive factors that enhance the adoption of ICT and e-learning particularly in engineering education. Through a systematic in-depth review of literature, the study aims to identify significant factors that will create an enabling environment to promote the adoption of e-learning in engineering education.

**BASIC TERMINOLOGY**

To prepare the groundwork for the subsequent review of literature, the following key words were combined for the search.

**E-learning:** e-Learning is defined as ‘flexible learning using ICT resources, tools and applications, focusing on accessing information, interaction among teachers, learners, and the online environment collaborative learning, and production of materials, resources and learning experiences’ (Moll et al., 2007).

**ICT:** Stand for information and communication technologies, it is different kinds of technological tools and resources used to create, and communicate, store, disseminate, and manage information (Yadav and Mehta, 2014).

**Engineering Education:** Engineering education is the activity of teaching and learning engineering and technology, at school, college and university levels. The goal of engineering education is to prepare people to practice engineering as a profession, to spread technological literacy, and to increase student interest in technical careers through science and math education and hands-on learning (SASEE, 2017).
Higher education: Higher education is education, research guidance and training that takes place once at the postsecondary level.

RESEARCH METHODOLOGY
The research methodology adopted for this paper was to conduct a critical review of the literature, which explored the factors influencing the adoption of e-learning in engineering education. The aim was to describe the significant factors inhibiting the adoption of e-learning and to propose a framework that will facilitate the adoption of e-learning in engineering education. This study follows a deductive approach. Dahlberg and McCaig (2010) described deductive reasoning as ‘top-down’ research approach which involves the process of generating hypothesis from a general statement to reach a precise, explicit and clearly defined conclusion. In a similar vein, Mouton (2001) stated that the most common forms of deductive reasoning in science include: deriving the hypothesis from theories and models; and conceptual explications: when the meaning of a concept is clarified through the deductive derivation of its constructive meaning. The sources of information for compiling the literature review included textbooks, journals, conference proceedings, roundtable discussions, dissertations and theses. Specifically, the search for information was carried out principally at the Cape Peninsula University of Technology (CPUT) at the computer workstation situated within the Construction Management and Quantity Surveying Department. The following databases were accessed during the literature search: EBSCO; Emerald Insight online; Business periodicals index; Social Sciences Index, Wiley InterScience, and CPUT’s own database.

FACTORS THAT ENGENDER THE ADOPTION OF E-LEARNING IN ENGINEERING EDUCATION
According to Basak, Wotto and Bélanger (2017), the integration of e-learning has become very essential in the development and accessibility of higher education in the perspective of engineering education. Hence, there is a growing request to adopt e-learning in Africa to meet the rising demand for both initial and continuing education. Furthermore, Basak et al. (2017) opine that if in Africa e-learning education is an emerging trend in both formal and informal education, further research and innovation experiences are required to diffuse and implement this new way of learning, to discover its multiple modalities, better understand the factors and environments facilitating or hindering its expansion and to explore both infrastructures and practices appropriate to the African context (Basak et al., 2017). By synthesizing previous research, four contextual elements have been identified to be significant in creating an enabling environment for the adoption of e-learning in engineering education. The four main constructs as depicted in Figure 1 include institutional support (Benchicou, Aichouni & Nehari, 2010; Bagarukayo & Kalema, 2015), capability of human resources (Attwell and Hughes, 2007), curriculum/content design and management system (Odunaike, Olugbara & Ojo, 2013; Bagarukayo & Kalema, 2015), and infrastructural and technical aspects (Muriithi, Horner and Pemberton, 2016; Bagarukayo & Kalema, 2015).

Institutional support
Benchicou, Aichouni and Nehari (2010) contended that the successful adoption and implementation of the e-learning approach is dependent largely on a set of critical success factors. Firstly, the extent to which the institution will adopt a formal and official e-learning strategy, secondly, the extent to which faculty members will adhere and adopt this strategy and develop ownership of the various measures in the context of their teaching and research responsibilities. And thirdly, the extent to which the university will offer adequate support in terms of training, software platform administration, online resource development and impact monitoring and assessment. (Benchicou et al., 2010). This is corroborated by Bagarukayo and Kalema (2015) who emphasised the need for institutional leadership, policy, and awareness programs to encourage the use of e-learning approach.
to improve institutional policy and delivery performance at HEIs. There is also a need to develop educational software tools to support e-learning activities (Bagarukayo & Kalema, 2015), such as Weblogs and the blackboard usage to enhance engineering education. Empirical evidence suggests that the role of institution is very imperative in the diffusion and adoption of e-learning in engineering education. This was evident in the case of Muriithi, Horner and Pemberton (2016) who examined the factors contributing to adoption and use of information and communication technologies. The study revealed that the institutions play a major role in defining the ICT and research environments under which researchers operate. The institutions also determine availability and access to ICT resources, creation of awareness of various technologies, building skills and providing for reliable technical support and motivation of researchers to engage in more research (Muriithi et al., 2016). As benefits of using e-learning medium, learners had rewarding and enriching personal experience and attributed instant accessibility to information and their facilitators. Learners enjoyed working collaboratively within diverse groups of race and social economic backgrounds (Bagarukayo & Kalema, 2015).

**Capability of human resources**

Odunaiké et al (2013) were of the opinion that one of the reasons for slow adoption of e-learning enrolment could be attributed to lack of adequate training of staff or instructor. Reason being that when the training is available and scheduled, it always coincides with academic programme thereby making participants either to skip the training schedule or have less concentration due to their workload. Bagarukayo and Kalema (2015) also noted instructor and learners’ difficulty in using the LMS due to inadequate ICT skills. Hence, adequate training is a very important enabler of e-learning implementation because there is a perception that technology does not teach by itself. Its operative relies solely on the human expertise. Training provides capacity, skills and knowledge that will drive the e-learning approach as an instructional offering (Attwell & Hughes, 2007). For instance, findings from the survey of 360 instructors from an ICT training project in Cambodia indicated that most staff members make use of their acquired ICT skills in some way after training, and some teaching staff actually re-invent the way to use their acquired skills. However, according to the results of the same study, the integration of ICT in teaching is still difficult for some instructors and these instructors require more training and practice (Richardson, 2009). This need for more training and practice is also supported by Jones (2004), Hennessy et al (2005) and Keong et al (2005). Nonetheless, Attwell and Hughes (2007) advised that the training should be adequately planned not to coincide with academic programme and should be on-going throughout e-learning life span. When training is lacking, instructors always become resistant to change by shunning the use of e-learning as their mode of teaching and learning. The resultant effect is the underutilisation of the LMS (Odunaiké et al., 2013). Cassim and Obono (2011) revealed that instructors’ demographic profiles, their positive attitudes, their awareness of successful and effective ICT integration in teaching, and their positive perceptions on the usefulness and ease-of-use of ICT, contribute to higher levels of ICT adoption for the teaching of word problems. For instance, Sang et al (2009) and Zhao & Cziko (2001) revealed that instructors’ educational beliefs impact on their use of ICT. This was the findings of a quantitative survey conducted by Sang et al (2009) and of a literature survey by Zhao & Cziko (2001). The same study by Sang et al (2009) which also identified attitude and motivation as factors influencing the adoption of ICT is supported by the results of a study conducted by Kumar et al (2008).

**Curriculum / content design and management system**

The educator has always been at the receiving end of any invented teaching and learning technology. From time-to time, lecturers are requested to learn one form of technology to another to keep abreast of teaching and learning aids that keep flooding the tradition classroom education. It ranges from chalk to blackboard to stylus to tape to CDROM to projector to computers to presentation slides to Computer Aided Teaching, to mention but a few (Bonk, 2001). There have
been some challenges in designing online contents and curriculum for technology-mediated education. It has been one of the reasons for under-utilisation of LMS and low e-learning offering patronage in engineering education. For this reason, Odunaiké et al. (2013) suggested that curriculum practitioner with vast knowledge in LMS and online education assists in guiding and coaching educators in developing their online documents and curriculum to facilitate adoption of e-learning in engineering education. Bagarukayo & Kalema (2015) also maintained that training users in content creation and ICT skills enables the development of localised content for teaching and learning. By creating and sharing local and customised content, the issue of diverse languages can also be addressed since the students’ study better in their first language. As a mark for quality control, various researchers (Kim & Bonk, 2006; Bates, 2009; Bonk, 2009) advocated the benchmarking of any e-learning implementation and practice with world renowned best practices to ensure that the quality of e-learning education is not in any way compromised. There are numerous standards and best practices relating to the use of Learning Management System (LMS), content development and management, administration of students and class list, administration of test and examination, management and access control. It is desirable to know what practice works, what practice does not work, and what practice needs to be improved (Kim & Bonk, 2006; Bates, 2009; Bonk, 2009). Hence, there is a need for instructor motivation and incentives for content creation for easy LMS-use. The instructor that develop and upload content can be a given bonus to motivate others; they should be sensitized of the e-learning benefits for adoption and must be assured of job safety and relevance as facilitators (Bagarukayo & Kalema, 2015).

**Infrastructural and technical aspects**

Due to infrastructure issues, the implementation of technology-mediated education in the field of engineering may be challenging in the developing world. However, most debates tended to focus on cost and proprietary versus OSS issues, and not technical aspects, during the e-learning-adoption decision making (Mlitwa, 2006). As a result, Bagarukayo and Kalema (2015) argued that technological aspects should be discussed for successful implementation of e-learning. Consequently, universities need to improve their technological infrastructure by seeking funding from Governments and Non-Governmental organisation to procure adequate infrastructure (Bagarukayo & Kalema, 2015). A cited example is a study by Muriithi, Horner and Pemberton (2016). The quantitative results indicated that majority of respondents had access to basic ICT resources, with over 80% having access to a computer or laptop at work or at home, mobile phone and internet connection at the work place. However, it is important to note that simple access may not translate to ready access at any one time one needs to use the resource. Respondents reported sharing of computers in their offices and constant internet down times, which does not translate to ready access. A number of respondents have invested in self-infrastructure, as seen in the high percentage of those with computer/laptop at home, though fewer indicated having means of connecting to the internet at home (51%) or internet access on a mobile phone (55%). Investment in self-infrastructure was seen as a response to unreliable computing facilities at the university, and a bid to increase flexibility in work processes and access to information. However, this comes with additional cost implications, especially as concerns internet access which was mainly in the form of privately owned broadband modems (Muriithi, Horner & Pemberton, 2016). Impliedly, E-learning implementation is capital and technological demanding, therefore, collaboration between content, pedagogy and technology is important for successful e-Learning (Bagarukayo & Kalema, 2015). Institutions can pool their resources together to gain advantages of large economics of scale. Although, the challenges and issues of enduring a community of practice among collaborators is eminent, however, partnering and sharing a wide range of ideas with regard to research, best practices, knowledge, technology and intelligence are some of the key attributes that can influence e-learning implementation at a lower cost (OECD, 2005a; OECD, 2015b; OECD, 2003; OECD, 2004).
SUMMARY AND CONCLUSIONS
As shown in Figure 1, this paper is a conceptual paper aimed at determining the factors that will promote the adoption of e-learning approach in engineering education. Two models have been conceptualized, the one displays the predictable factors influencing behavioural intention to adopt e-learning, and the other depicts predictable factors that could augment the extent of adoption of e-learning approach in engineering education. It can be inferred from the proposed conceptual model that institutional support system that could facilitate the adoption of e-learning include the availability and implementation of e-learning policy / strategy, funding for and investments to support the offering of e-learning, and impact monitoring and assessment. It can also be seen form the model that human resource capabilities that enhance the adoption of e-learning include attitude of staff, commitment of staff, experience, motivation and job security, and training and practice. The study also conceptualised that the availability of soft technology / software tools, software platform administration, hard technology and collaboration between other institutions are regarded as the most important infrastructural and technical needs to promote the adoption of e-learning in engineering education. Furthermore, it can also be deduced from the model that curriculum / content design and management systems regarded as the most important to promote the adoption of e-learning in engineering education include online contents, availability of online curriculum practitioners, quality control / best practices, and knowledge and information management.

In conclusion, it is anticipated that in model one (1) that the institutional support system, human resource capabilities, the infrastructural and technical needs, and curriculum/content design and management systems will be adopted as a trigger to influence the intention to adopt e-learning. It can also be anticipated in model two (2) that institutional support system, human resource capabilities, the infrastructural and technical needs, and curriculum/content design and management...
A conceptual framework for enhancing the adoption of e-learning in engineering education.

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Use of Information Communication Technology to Bridge the Gap Between Universities Requirements and Engineering Industries Demands: A Case Study of Using Virtual Classroom to Capacitate Select Employees.

Dirk DICKS
Vaal University of Technology, Vanderbijlpark South Africa,
Engineering Development and Support Unit
dirkd@vut.ac.za

Maurice NDEGE
Vaal University of Technology, Vanderbijlpark South Africa,
maurice@vut.ac.za

ABSTRACT
The present article represents statistical results following the success rate of artisans that were trained to become technicians through virtual classroom offered by Vaal University of Technology (VUT) for a private company. Due to the success rate of previous on-site training of artisans to become technicians, the company sought to train more employees; those on-site in Vanderbijlpark simultaneously with others in its branch in Newcastle about 300 km from VUT. However, cognisant of a need to avoid incurring travelling costs or sending artisans to the VUT campus for fulltime studies, the Engineering Development and Support Unit designed a relevant converting programme, facilitated via virtual classroom, to provide a teaching and learning environment in which participants could interact with learning resources and with one another, similar as they would in a traditional classroom. Artisans were granted five study time hours by the company and each had to commit one hour of their private time for every hour granted by the company. A comparative study of pass rates between the two groups of students reveal that the joint effort can contribute towards closing the gap between the university's and industry's requirements by providing well-qualified technicians competent in the global market.

Keywords: On Site Training, virtual classroom, teaching and learning environment, comparative study.

1. BACKGROUND
Academic institutions have been previously criticised, by practitioners, for not providing well-qualified graduates in the industry. These practitioners claim that graduates have little practical knowledge whilst most academic institutions will defend their right to set specific educational objectives (Davies, Csete & Poon, 1999:191). A key aspect of South Africa’s National Development Plan: Vision 2030 (2011) is that sustainable development of; business, government and civil society should play inter-related roles in order to improve the lives of all South Africans (Taylor & Govender, 2013:14). The White Paper which represents the post-school education and (2013) highlights the responsibility of higher- and further education and training institutions to ensure that
the education and training provided meet the needs of industry. Furthermore, the White Paper for Post-School Education and Training (2013:36) states that successful vocational or occupational learning takes place through the integration of theoretical learning, workshop-based practical learning, as well as learning in the workplace. For this reason, the Department of Higher Education (DHET) places a significant emphasis on workplace-based learning.

During May 2005, Prof. Karl-Heinz Dröge, from the Berufsakademie in Lörrach, Germany visited VUT. The objective of this visit was to present the "Berufsakademie Model" – University of Cooperative Education as a workable model for the Universities of Technology in South Africa to representatives of industry, Ministry of Labour, Services Education and Training Authority Services (SETA), University administration and staff. The presentations at VUT was held at a National Seminar (15th April 2005), which consisted of internal workshops and seminars for University staff and Industry. With regard to structures and processes, the question was asked whether the German-designed Berufsakademie Model (BA) could possibly be a solution to higher education in South Africa.” A similar model to the BA model, known as the South African Higher Education Model (T-courses), was offered by all Technicon’s (now Universities of Technology) in South Africa during the early seventies. During a comparative study by Prof Henk De Jager (2005), the then Dean of Engineering at VUT assessed both the South African Higher Education Model and the BA model. The following observations were documented in this study:

- The T-courses were highly successful and well accepted by employers. However the system was changed due to the fact that the economic situation in the country forced industries in South Africa to take the option of recruiting students who successfully completed their academic studies, rather than employing students first before they commence with their studies.
- The T-courses curriculum was determined to be beneficial to both industry and students where; 1) Graduates with high work performance were generated; 2) Graduates had no problems when transferred into other functions within or outside the company; 3) It was possible to observe a future employee for a period of three years; 4) Students were paid a monthly training allowance; 5) Short term study for students, 6) a higher student success rate; and 7) Increased job opportunities.
- The biggest advantage for the Universities was that the throughput rate of the T-courses was high. Additionally, quality graduates were provided to industry, meeting or in many cases, exceeding industries’ demands. Presently, the main problem is that a number of companies are no longer using the T-course model. However, the authors of this article are of the opinion that once companies, as well as SETA’s can find their proper footing, universities such as VUT can and will be leaders in the field of “knowledge transfer”. Owing to the fact that partnerships like these developed together.

Although there are similarities between the BA model and the T-courses model practiced by Universities of Technology in South Africa, there are still a number of problems currently experienced within the country concerning the South African Higher Education Model (T-courses). The authors believe that the BA model (with minor adjustment) could be a workable solution for higher education in South Africa. To prove this statement a pilot programme entitled “Converting Artisans to Technicians” (A/TC Programme) based on the majority of characteristics of the BA programme was introduced by the university at a large company (Company A) in the Vaal Triangle, Gauteng Province, South Africa. The first intake of students was in 2006, the second semester.
2. **PROBLEM STATEMENT AND RESEARCH QUESTION**

The major concern regarding the implementation of the BA model for industry was that industry could not send their employees away to university for a period of 6 months (T-course). This was due to both the pressures at work and shortage of manpower within the industry. The question was therefore posed: ‘If industry can’t send the students to the university, why can’t the university send the university to industry?’

3. **OBJECTIVE**

The primary objective was to provide industry with onsite training by means of teaching, training, academic management and administering of the National Diploma in Engineering. This modified approach was communicated to the company and during 2006 they requested the Vaal University of Technology to run a pilot programme in order to assist in converting their artisans into technicians. It was however not possible for the company to send their artisans to the University of Technology for a full semester study period. The secondary objective as reported in this article was to determine the viability of the programme from the student’s viewpoint.

4. **PROCEDURE OF PROGRAMME IMPLEMENTATION**

4.1 **Administrative Procedures**

The structure and procedure entailed that the A/TC started with a small group. The company allows their employees 1-hour study allowance for every 1-hour private time taken therefore, 10 hours per week. University staff members, as well as staff members from the company, presented the programme over and above their existing workload (after hours). The A/TC Programme started with four groups (4) groups, each taking two (2) subjects per semester on, days and times, as mutually agreed upon the onsite-presenter. The process of registration for successful candidates was handled by the Engineering Development and Support Centre (EDSU). The company was responsible for the screening of prospective students based on a portfolio compiled by students. Portfolio’s containing certified copies of grade 12 (NCS) results or an equivalent qualification, identity document, all diplomas and certificates, as well as a summary of the student’s work experience was required. The university applied its Recognition of Prior Learning (RPL) policy and upon successful recognition, enrolled the students before the census date of every academic year. Portfolios were stored for record-keeping purposes. All examinations were written at VUT on the same dates and at the same times as the mainstream programme.

In order to ensure the quality of the programme, the input criteria were changed. Students were only accepted into the 5th intake of the program if he/she had obtained a mark of at least 40% for a Technical evaluation test in the applicable Electrical discipline set up by the company. At least 60% in a Learning ability evaluation test and, if both tests were passed the candidates had to go through a behavioural assessment test. Only candidates in the top percentile were selected to enrol into the programme. We encourage students to give up their negative attitudes that get in the way of their success (Scheele, 2007:17).

4.2 **The Virtual Classroom**

Group 5 intake included a group of students situated in Kwa-Zulu Natal (KZN) Newcastle, approximately 300km from Vanderbijlpark, by use of the virtual classroom concept. The company additionally added to the classroom infrastructure by providing all interactive virtual classroom equipment. In July-2007 the first parallel sessions were lectured from the premises in Vanderbijlpark.
directly to the premises situated in Newcastle (KZN). A qualified Tutor was appointed by the Company in the Newcastle branch to oversee the process.

5. RESULTS OF THE STUDY

5.1 The Effectiveness of the Artisan to Technician Conversion program

The effectiveness of this programme was determined by the number of students who graduated within the six-year time frame as set during the planning of the programme. The successful completion of the programme is summarised in Table 1.

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<th>Group 1</th>
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<th>Group 4</th>
<th>Group 5A</th>
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<tr>
<td>Number of Students started</td>
<td>23</td>
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<td>14</td>
<td>15</td>
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<td>Number of Students complete their studies</td>
<td>11</td>
<td>14</td>
<td>14</td>
<td>8</td>
<td>11</td>
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<td>Students completed qualification</td>
<td>48%</td>
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<td>5 Students Enrolled for BTech degree. Completion December 2018</td>
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5.2 Questionnaire Outcomes

5.2.1 The Virtual Classroom and Smartboard

The setup of the virtual classroom took into account that the students had several responsibilities that needed to be balance against both the demands of their learning and work.

The learning experience of student by means of video link i.e. using the smart board was beneficial to the students as they strongly agreed (68%) that this was a sufficient method for learning while
41% were positive about the Interactivity of learning experience, and 41% neutral on the find it easy to understand the lecturer as can be seen in the following figure.

![Effectiveness of Learning Experience using the smartboard facilities](image)

**Figure 1: Effectiveness of Learning Experience using the smartboard facilities**

### 5.2.2 Students’ General Comments on the Virtual Classroom

In general, the following typical comments were made by students concerning the use of the SMART BOARD concept:

- “So far so good”
- “A bigger LCD to see the lecturer would be appreciated, other than that this is a(n) excellent study method”
- “It is an interesting way of learning. I like it.”
- “The video conference / SMART board facility is above my expectations!”
- “Think this is a good way to study via a video link, there is a few things to improve”

### 5.2.3 Student Preferences for Attending Classes at University Fulltime, Onsite Attendance at Company or Part-Time Attendance at the University

About 64% wanted to attend the mainstream course at the University, e.g. “Mostly when attending class, we are from a stress full work environment and tired. Some days we got breakdowns and have to leave job incomplete-come to class then go back, it causes tension between colleagues.” and “It will be better to do the subjects fulltime at the University because it is difficult to work shifts and study at the same time.”

Furthermore, 33 % wanted to attend the onsite course at the factory e.g. “I’ve got a wife and a son, at the moment they are my priority so I need to spend some quality time with them. The onsite training makes it possible to keep a balance between your work, studies and family.” and “Living in
Company B makes it impossible to attend the part time after hour’s course at the University. Being employed full time and being a family man makes it impossible to attend the mainstream course”.

Two percent of the students wanted to attend the part time course at the University e.g. “Will have better access to campus lecturers, still have family this side, I think some lecturers do not understand what student asked - they find it difficult to explain the question”.

5.2.6 The Overall Rating of the ArTC Programme

The overall rating of the programme indicated that 48% of the students find the programme to greatly aid them in their studies. Moreover, the majority of students 79 % was positive about the programme. The major concern from the students’ side was the duration of six years as well as working and studying simultaneously. Students did however realise that the ArTC programme created a unique learning opportunity which would enables them to better themselves in their work environment. Additionally, due to the student’s practical background, concepts that were taught throughout the programme were not completely new. Throughout the programme lecturers applied the well-known didactic principle - “to move from the known to the unknown” - during their lecturing sessions. Through use of this didactic principle an opportunity was provided, enabling students to understand and construct their own learning. This allowed students to change their attitudes and beliefs so that they can make sense of things they already knew.

6. CONCLUSION

The projects and initiatives mentioned are an overview of what has been implemented to date to improve teaching and learning, ensuring that quality graduates will be produced for industry. The authors believe that these initiatives and processes can cultivate quality-engineering graduates and will contribute not only to the success of the industries in South Africa but ultimately to the engineering profession and the economy.

7. RECOMMENDATION
Whilst this model has assisted in creating a new form of access for students intending to pursue higher education the following matters need also to be addressed and controlled for the sake of the reputation of the University: Entry requirements, Quality control, Financial models, Internal staff and external facilitators, and audit trail. To assist with all these factors mentioned above it would be advisable that a dedicated body to advertise manage and drive this concept would be in place, but part than that the authors believe the BA model, with minor adjustment, can be successfully implemented in South Africa.

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Digital Education

- Lessons learned from developing digital teaching and learning concepts in higher education

Kerstin SCHULTHEISS
Flensburg University of Applied Sciences, Flensburg, Germany
kerstin.schultheiss@hs-flensburg.de

ABSTRACT
Today’s students are digital natives, who want their education to prepare them for the future according to their digital environment. Therefore, universities need to focus on digital transformation strategy of teaching, learning, research, administration and infrastructure. Flensburg University of Applied Sciences has started an initiative called African-German Virtual Academy (AGVA), funded by Schleswig-Holstein Ministry of Education, Science and Cultural Affairs. The project initiative aims to virtualize courses and to focus on need-oriented, sustainable course development in order to provide new formats of teaching and learning in a digital learning environment. Different concepts of online and blended learning courses have been developed and implemented. This paper describes the process of course development using ADDIE model and discusses challenges towards digital teaching and learning approaches underlying the framework of a traditional campus university, which is on an early stage of digital transformation process. Beside structural and didactic factors influencing course development, the results will also show how to overcome digital barriers and limited human capacity.

Keywords: Digital Education, Virtual Academy, Digital Transformation in Higher Education

INTRODUCTION
Today’s students grown up as digital natives in a globally connected world with access to information, content and resources in the worldwide web. In Germany, the smartphone users has nearly multiplied tenfold from 6 million in 2009 to 57 million in 2018 (Statista 2018). The digital revolution and constant technological progress have trigged huge potential for making learning available anywhere and anytime, allowing learners high flexibility to access knowledge and participate in educational activities at the point of need. It can change the entire framework for the transfer of knowledge and consequently, universities will need to develop new role models and adapt their teaching and learning beyond traditional classroom education. The digital age is calling for innovation in both traditional pedagogy and digital education formats (Müller-Eiselt, 2014). The transformation towards digital education requires change processes on various levels of educational institutions. It strongly depends on the will of the university management and their power to convince faculty and department members as well as individual professors, whether innovations in the field of digital education can be fostered (Themengruppe Change Management & Organisationsentwicklung, 2015). The Bertelsmann Stiftung’s Digital Education Monitor 2017 project divides the perception of university members equally in two camps: confirmed digital advocates and confirmed analog skeptics. This shows that implementation of digital transformation strategy faces challenges of acceptance across the higher education landscape in Germany. Not knowing resources involved in course development of digital learning environment and assessing the available in-house resources, project initiatives are often neglected in this field. Tapping the impact of digital education requires piloted approaches to identify what is educationally feasible and worthwhile on implementing new teaching and learning formats.
This paper describes the process of the course development and discusses challenges towards digital teaching and learning approaches underlying the framework of a traditional campus university, which is on an early stage of digital transformation process. The focus is on online and blended learning courses with emphasis on course design of different formats. Based on the project initiative called African-German Virtual Academy the ADDIE model is described including -analyse, design, development, implementation, evaluation – and the course portfolio is presented. Finally, the paper will discuss how to overcome the digital barriers and limited human capacity in higher education, how to portion learning materials and contents, and how the role of professors will change in a digital learning environment.

PROJECT INITIATIVE: AFRICAN-GERMAN VIRTUAL ACADEMY (AGVA)
AGVA is a project initiative of the Centre for Business and Technology in Africa at Flensburg University of Applied Sciences, which has been promoting an active exchange between students and educators and universities in Namibia, Cameroon, Ghana, Ethiopia and Kenya for more than 15 years now. The centre supports innovative projects, emerging businesses and first-class education in Africa by connecting people, sharing knowledge and promoting exchange. AGVA, funded by the state government of Schleswig-Holstein, develops new course concepts based on different teaching and learning methods and types of interactivities, which allow students, institutions and industry to share cross-border experiences and to be part of the exchange in the field of ,Information Technology‘, ’Logistics in Emerging Economies‘ and ’Business in Africa‘. Educators are assisted to digitalize teaching materials and to integrate digital media into their classrooms as different course formats are supported by different technical means, various teaching and learning activities as well as pedagogical principles. AGVA runs a website with online registration tool, course introduction videos and latest news blog for demonstration purposes.¹

Course Portfolio
Since 2016, AGVA designed and implemented different courses, which can be classified in Blended Learning and Online Learning courses. Blended Learning is a pedagogical model that combines traditional face-to-face learning system with multiple online learning and teaching methods and its adoption of digital learning technology (Graham, 2006). Online Learning has been evolved out of distance education using web-enabled devices to access course content and the primary delivery mechanism is via online classroom environments (Allen & Seaman, 2011). Figure 1 provides an overview of AGVA’s course portfolio with the underlying instruction method, subject, interactive tools and resources.

¹ www.virtual-academy.org
Inverted Classroom is a type of blended learning that reverses the traditional learning environment by delivering content outside of the classroom e.g. online (Arnold & Kilian, 2018). Students arrive to face-to-face classroom session after they have watched online lectures (screencasts), collaborated in online discussions through webinar, and prepared given exercises at home. During face-to-face sessions, students discuss the exercises prepared, clarify questions about the online content and engage in conversation and feedback about the concept with guidance of the professor.

Online Project focuses on the development of an applicable dashboard to process data and present results. The professor gives the theoretical foundation and presents the task in a face-to-face environment. Afterwards, students work on their tasks and collaborate online using a software lab.

Online Seminar aims at the acquisition of skills through learning tasks focusing on the ability to understand complex systems and learning transfer to apply concepts in practice. Open Educational Resources (OER) compiled in a repository and accessible 24/7 on a self-study basis for students to provide the foundation of knowledge necessary to continue with further guided tasks and assignments. A non-graded self-test and continuous written feedback by the professor support students on their knowledge examination, content development and progress in the acquisition of competences.

Teleteaching is carried out in a synchronous and asynchronous mode. Live lecturer through video conferencing system and eTutorials provided responsively according to a set schedule. The individual project work refers to a dashboard, which is provided for qualitative assessment of data and business decisions.

Online Self-Study allows student to study independent when they want and where they want. Contents underlying a book with reading assignments on relevant chapters and special focus.
Additional course materials like videos, online articles and expert interviews explore those topics more deeply. The learning contents are divided in to thematic blocks and students are guided by interactive tasks and self-tests at the end of each block. The self-study course aims to acquire basic knowledge as stand-alone course and to be adaptable as preparation course for other formats e.g. face-to-face seminar.

**Course Development**

The development of online courses requires its own didactic design to cover the methodology, skills, and techniques. There are instructional design frameworks describing the process of planning and implementing educational and training programs by assessing learning needs, determining learning outcomes and teaching contents. In AGVA the course development is based on the so-called ADDIE model, which is used as practical guideline for the overall course design. Although ADDIE model is not a formal instructional design model, it is widely used as a framework for instructional designs of E-Learning courses (Niegemann & Hessel & Hochscheid-Maul, et.al, 2004). ADDIE represents five universal key principles of course designs for education and training development: Analyse, Design, Development, Implementation, and Evaluation.

**Analyse:** First stage is to determine the target group in terms of previous knowledge about the topic and learning objectives of the course. Afterwards appropriate learning strategies with multimedia and interactive course components, tasks and success criteria can be identified. Technical requirements and limitations are considered to choose the mode of delivery. Specifics such as cultural and educational background of participants can play a role in choosing the pedagogical approach. A proper analysis helps to identify challenges that may exist with limitations and opportunities, or other important points that will be useful in the design and development stage.

In AGVA, students from Namibia, Cameroon, Kenya and Germany attend the courses. The time schedule and consultation hours is adjusted to the special needs, as most of the students in Africa are employed and studying part-time. All participants are used to traditional classroom education, where social interaction between students and professor is a big part, e.g. raising hands, asking and answering questions or giving presentations and oral feedback. This type of interaction is different in the online courses and need to adapt new methods of teaching and learning. During the production of multimedia learning materials, the limited streaming capacity and infrastructure of information and communication technology are considered.

**Design:** Information obtained from the analysis stage is used to determine strategies regarding the delivery method in conjunction with learning theories and principles of teaching and learning. A first rough draft of the didactic scheme is developed, which includes learning objectives, learning materials, tasks and exercises, media, resources, interactivities, tools, technology, and support. The design of tasks, activities and exercises is an important point as these link the cognitive processes between learning materials to intended action. Different methods and tools are used to present the learning materials.

In AGVA, courses follow a structured self-paced learning method. Course materials can be retrieved on demand within a preannounced period, which enable students to study on their own pace and take control of their learning. Different methods and tools are used to present the learning materials in relation to the learning objectives. Tasks and activities follow a set of content, which provide underlying concepts and principles to facilitate learning of knowledge and skills. Each activity starts with background information followed by a task description to provide all the relevant information to process the task. The course design includes rather asynchronous than synchronous communication tools, videos are produced with lower resolution and educational resources were partly embedded from streaming providers like YouTube. The structure always include
Development: The development stage is to produce the course materials, activities, learning exercises and tasks that will be utilized in the course, as well as the integration of any technologies such as videos and simulations. The didactic scheme and strategies being used in the course are developed, assembled, tested and revised according to any feedback given until the course is complete and ready for implementation.

In AGVA, selection of contents and activities are based on the teaching and learning experiences, which have been gained during face-to-face seminars in Germany and African countries. It has been found that fundamental concepts and theoretical background information are sometimes difficult to understand and challenging for students to apply. For their learning process they need practical examples in order to be comprehensible and only then they will be able to apply the concepts to their “own system”. A crucial aspect is the development of tasks and activities for students to practice their new knowledge, which should be logical and orderly to avoid questions concerning the task description, however, not too abstract for students to follow. The development of learning materials is based on the curriculum including learning objectives and the topics to be covered, which differs in every course. There are internally produced materials e.g. screencasts, tutorials and expert interviews or open resources available in the worldwide web e.g. videos and materials based on the license of OER. Some courses include non-graded self-test to ensure that all students are on the same level of knowledge and for their orientation on learning progress. Multimedia content like videos or expert interviews provide practical examples and help to bridge the gap between theory and practice. Videos are 3-10 minutes in lengths to avoid that students lose interest or become distracted.

Implementation: In this stage, the course is rolled-out. Students are introduced to the course environment, curriculum, teaching and training methods. There are also organisational tasks, e.g. registration of students, public relation. Courses are monitored throughout the implementation phase to modify and adjust the course design as needed. The goal is to deliver the course effectively.

In AGVA, professor or tutors introduce students to the course and digital learning environment either face-to-face, webinar or introduction video. There are information concerning course design, learning objectives, learning materials, tools, course organisation, and how to access Moodle-LMS on mobile devices. The learning space on Moodle-LMS is built on the sequential approach. Activities are structured into phases or weeks. Instead of providing all learning materials at once, students have to finish their tasks and activities successfully before they are enrolled in the next phase. Then they access another set of learning materials and are enabled to work on further assignments. This approach provides structure and helps student to focus on what is most relevant and important. Moodle-LMS includes a progress bar, which allows students and professor to track and monitor the completion status of tasks and activities. The professor can access an overview page showing the progress of all students, which is helpful to identify students who are on track and who may be at risk and to encourage inactive students to re-engage in the course. Except for the self-study course, questions are answered on demand, which require a high flexibility and unpredictable supervision workload. If there is no designated face-to-face time, the most challenging part for the professor is to assess if instructions and feedback given are understood clearly.
**Evaluation:** There are formative and summative evaluation based on feedback, surveys, and even analytics. Formative evaluation is done during every stage of the ADDIE process and throughout the implementation phase of the course to ensure the quality of the digital learning environment. If necessary, adjustments can be done during the implementation stage. Summative evaluation occurs at the end of the course in order to determine acceptance, learning outcome and user-friendliness for modification of the instructional design for future courses.

In AGVA, evaluation is carried out at different steps and in various procedures to gain information of the course from different angles and to assure quality, which incorporates into an overall context of the course design. All the course elements are pre-tested to gather information about weaknesses and to revise the course materials. The pre-test group represents a sample of the students being equivalent in structure and representativeness to the target group. Students enrolled are requested to give their feedback by structured, anonymous surveys to assess course design, methodology, quality of the teaching and learning as well as technical components.

ADDIE model can be seen as an orientation model, which needs to be adjusted according to special needs and requirements of the respective situation.

**DISCUSSION**

An initial objective of AGVA is to identify challenges and lessons learned on factors influencing the overall project initiative during the development and implementation process. Some of these challenges have already been discussed in the previous chapter. Designing a strategy and course formats suitable for a digital learning environment is a continuous process of aligning an institution with its environment and changing factors towards digitalisation. In AGVA, three primary factors – institutional requirements, methodological approach, human and technical resources -affected the project design process and strategic decisions. These experiences have led to raise the following statements for further discussion.

**Outsourcing – an option to overcome the digital barriers at higher education institutions**

The first courses developed in AGVA were based on human and technical resources available at the university. At the beginning, existing learning materials were transformed into digital formats e.g. screencast, as digital video recording that captures actions taking place on a computer display with voice-over narration. Gradually, digital learning materials were supplemented with a methodical design of learning objectives, sequencing, choice of learning strategies and delivery formats. Digital tools and digital content were integrated in ways that guided, engaged and connected students to course content and enhanced problem-solving capabilities. The scope of functionality of the learning management system with interactive activities and assessment tools was part of the methodical approach. The more resource intensive production of learning materials e.g. self-produced introduction videos and recorded expert interviews led to search for OER available and added as course materials. Although other departments assisted AGVA in integrating educational technologies, development of digital content and learning management system support the limits of internal resources and capacities were reached at some point.

The development and management of online courses requires the involvement of a diverse group of people with unique skill sets like project manager, content experts, instructional designer, graphic and media designer, developers, technology experts and quality analysts. Knowing the resources involved in online course development and assessing the available and accessible in-house resources at the university, AGVA took the strategic decision to outsource some components of content development and hosting of the learning management system permanently to German and African institutions. Rather than building capacity to offer and operate online learning courses within the university or academic unit, outsourcing can be a game changer for institutions in higher
education because it not only introduces a new model for the development and delivery of online courses, but it can enable universities to meet required parts of digital education and adjust dynamically.

**Learning Nuggets – lasting trend in digital learning**
The design, development, and integration of online courses main purpose is to meet the needs of the students. Learning materials designed for online and mobile environments, require an adapted methodological approach, structure and duration time of units. AGVA found out that students get distracted when the lengths of a video or presentation exceed 10 minutes in asynchronous parts of the online course. Interactive videos can maintain students’ engagement, attract their attention and interest through embedding additional activities e.g. quizzes, feedback, polls or problem sets that reinforce the learning process. Applying the limited attention spans of students to the course design, means a change of activities, tasks or switch of media at least every 10 minutes. There is a trend towards micro learning courses consisting of so-called learning nuggets, which are rich media formats with a length of 2-5 minutes. Learning nuggets are easy to deploy on mobile phones, and can be updated and mixed according to the content and topics relevant for the course. Micro-courses can be used as stand-alone or multiple as sequences of topics.

The teleteaching course of AGVA has been rolled-out in one module and is going to be offered in four sub-modules, including learning nuggets. Further course development will strategically include learning nuggets as components to use flexible in different courses and less resource intensive update of content. These learning nuggets meet the trend in technology towards emerging and mobile tools in mobile learning environments.

**Future Professor – facilitator and coach**
Online education can be viewed as an innovative change of teaching and learning through technology according to the 21st century opportunities across the globe. As there are new possibilities to develop and deliver courses, the role of professors has changed, in the same way that students, as digital natives, connect and relate to each other has changed. Interactive and collaborative learning on digital learning environments and instruction delivered through multifaceted modes of learning require professors who are flexible and able to adapt to change of digital world development. In online course development, professors are content expert aside a group of professionals with different skill sets. During course implementation, they play a key role in engaging students with each other and with the learning content by creating a learning community that will provide students with equal opportunities for communication and interaction in face-to-face as well as online course environment and pedagogical support.

The experiences of AGVA showed that a new role of the professor paired with new formats in learning and teaching take place gradually. During the online courses, students still required guidance and feedback for orientation on their learning achievements. Self-tests supported the review and reflection of learning materials provided. Individual feedback, reinforcement and encouragement was required on assignments and project work by the professor. The course format of online seminar required a constant monitoring of the learning progress and feedback on assignments to ensure desired learning outcome. As soon as students and professors feel comfortable to work with digital learning materials, online learning environments and mobile devices, new formats like peer learning, collaborative learning settings, self-paced and independent learning will shift professors’ role more and more from being a lecturer, to a facilitator and coach for students.
CONCLUSION

For professors and other university members, digital education is often perceived as an additional workload and unrateable potentials. There is still too little known about cost-benefit of digital learning and teaching concepts. At universities, there is a lack of qualified employees in the area of instructional design, media design, and technicians, who support professors in the development and integration of digital learning and teaching concepts in their courses. AGVA has evolved out of a clear orientation towards need and bottom-up approach. This project initiative was undertaken to develop and implement online and blended learning courses. It has been shown what steps are necessary to design courses and which challenges may occur during development and implementation. In the final statements, some ideas and recommendations were discussed for further strategy towards digital education at universities underlying a traditional campus framework and institutional structure. What has not been done in this project initiative was to discuss the potential and scope of digital learning environment if educators start to rethink and take digital education to a new level without holding back to traditional framework and mind-sets. It is not about rebuilding analogue structures on a virtual level, but inventing entirely new forms of collaboration, knowledge ecosystems, and open shared resources – let us call it education 4.0

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Implementation of Digital Education on Small Island Case Study: Maratua Island Indonesia

M. Badrus Zaman
Department of Marine Engineering, Institut Teknologi Sepuluh Nopember (ITS), Surabaya, Indonesia
druz_zaman@ne.its.ac.id

Setyo Nugroho
Department of Marine Transport Engineering, Institut Teknologi Sepuluh Nopember (ITS), Surabaya, Indonesia

Eko Budi Djadmiko
Department of Ocean Engineering, Institut Teknologi Sepuluh Nopember (ITS), Surabaya, Indonesia

Murdjito
Department of Ocean Engineering, Institut Teknologi Sepuluh Nopember (ITS), Surabaya, Indonesia

ABSTRACT
Small islands are home to challenges that must be completed and developed. Starting from the transportation sector, tourism, energy, education, etc. this research develops the role of information and communication technology for teaching-learning activities in small islands, examines the role of technology as a supplement to the teaching-learning process. In addition, this research also aims to design a physical and digital architecture of educational system which can be implemented in small islands in Indonesia, designing a learning methods to support teaching-learning process and educating stakeholders about the concept of digital education. In this context, the digitalization process based on the existing curriculum was developed. For supporting this concept, the classroom infrastructure and the internet network on the island are also developed. A technology network on the island is also developed. A technology-based education (digital education) development will support the community in Maratua Island. Research related to the development of small islands needs to have a blueprint of sustainable development so the positive results or vice versa could be noted to be applied on other islands.

Keywords: Digital education, Small Island, Maratua.

INTRODUCTION
Island communities are an integral part of Indonesia. With its some 17,000 islands, Indonesia is the biggest archipelagic country in the world. Unfortunately, they lack many things, from healthcare, energy, clean water, poverty, environment threats, transportation, till education. Maratua Island is one of the example. Located in Berau District, East Kalimantan Province. This is a U-shaped island with a shore area of approximately 395 km², surrounded by water sea area of 3,735 km². The limited economic power, limited number of inhabitants, and remoteness of the locations, make them hard to acquire a descent quality of life. Therefore, the development of small islands is a
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challenge for the government and society and for science. Education serves as one of the means to address the above challenges.

The disparity in access and expertise in utilizing information and communication technology (ICT), especially between the advantages and disadvantages of student in social, economic, and community among isolated regions and urban areas, has been the focus in the public policy. The term “digital disparity” was created to emphasize the fact that this kind of disparity can threaten the social order and countries (OECD, 2015).

Information and communication (ICT) has shown its usefulness in addressing educational challenges in many parts of the world, both developing and developed countries. This research provides solution to the educational development that most suitable for Maratua Island. Then there must be educational material and supporting educational processes such as books, infrastructure, teaching aids and technology. The quality of human resources, availability of electricity, economic level and many other factors influence the quality of education on small islands.

This research implements the role of information and communication technology for the teaching and learning activities of island communities, examines the role of technology as a supplement to the teaching-learning process, analyzes constraints, and optimizes the use of energy resources for the teaching and learning process. In addition, this research also aims to design a physical architecture and digital education system that can be implemented on the outer small islands in Indonesia, design a learning method to support the teaching and learning process, and educate education stakeholders about the concept of digital education.

STUDY AREA

This research was conducted on the island of Maratua, East Kalimantan, Indonesia. Figure 1 shows the area of research.

![Figure 1: Maratua Island](image)

This research located in Maratua Island. Figure 1 shows the location of Maratua Island which is located near the island of Kalimantan. On this island, there are many opportunities that must be developed, ranging from the tourism sector, the energy sector, the transportation sector and the education sector. The introduction of technology is necessary for the development of an island. Communities are increasingly unable to avoid technological advances rapidly. The development of information technology must be utilized for the development of the education sector. Then, the improvement of human resources from a teacher must also be increased. The teacher should be good in teaching, and also should be smart in using technology to support the teaching-learning process.

In the teaching-learning process, methods are also needed in order to be able to achieve the expected learning output. Digital education will be able to help a development of modern learning methods. Thus, learning targets will be easily obtained and implemented. This study will also be explained about the architecture and learning applications that are very easy to understand to apply.
EDUCATION ON MARATUA ISLAND

Education on the Maratua Island needs to be developed, both in terms of curriculum development, infrastructure and teachers. There are six school buildings spread across Maratua Island, four elementary schools, one junior high school and one high school. This condition requires attention to be developed.

![Elementary Student learning activity](image)

**Figure 2: Elementary Student learning activity**

Figure 2 shows the student learning activity. Based on condition of facilities, increasing quality of education should be conducted. All potential should be explored.

DEVELOPMENT OF DIGITAL EDUCATION

About 3,000 inhabited islands in Indonesia are the biggest challenge for educational equity efforts. In addition to infrastructure development which is not a small burden of the state budget, the quality and quality of education is also a challenge that must be fulfilled to date. Significant differences both in terms of infrastructure and quality of education, are one of the causes of human mobilization with the aim of getting a better education. This phenomenon will increase the value of economic needs that are not small, both for the right needs of temporary living and other life support. The government has sought to improve education infrastructure in small islands, but the development of educational infrastructure also requires the development of infrastructure, including the availability of electricity, transportation, and so on. Infrastructure development is not only in the form of school buildings, but also the provision of teaching and learning facilities, the availability of teaching materials is also one of the challenges that must be faced in the teaching and learning process on small islands. The number of textbooks is always less than the number of students in school, so students must share textbooks that reduce the optimization of the learning process.

It should be recognized that teachers in small islands are very unpopular when compared with schools on the main islands. On small islands, the number of teaching staff is very limited (based on a survey by the Central Bureau of Statistics), with a teacher and student ratio below 1:35 - 1:45, very far compared to the national standard ratio of 1:15 - 1:20. This condition requires the same development in the area of education for all regions in Indonesia, both on main islands and small islands. This challenge must be able to be answered by using all methods, because education is one of the pillars supporting the progress of the nation, infrastructure development must be accompanied by the provision of teaching resources or by the use of technology to reduce hollow sectors due to lack of infrastructure development and provision of teaching staff.

Education based on technology is not a new concept. The use of technology in education has been implemented for a long time. The use of technology in education is widely used as a media to enhance the students to understand a teaching material. Scheme of digital island shows in figure 3.
DESIGN OF DIGITAL EDUCATION

Digital system of education is not just changing the conventional textbook into a digital version, but also using applications which is facilitating the teaching process for a better quality. Currently there are thousands of applications that exist in the world of education, both of which use the Indonesian and moreover use English. Thousands of these applications are still underdeveloped, lack of activity causes the application cataloging applications that education is nothing less can be used. Figure 4 shows an example of learning application.

In supporting the process of cataloging educational applications and to increase the penetration of the system that allows it to be accessed by many parties, this research also produces an educational application database information system that has been installed on the cloud server as shown in Figure 5.

Figure 5: Website of educational app catalog

There are two scenarios for developing digital education, first, the development of digital systems network and second is the development of applications in the classroom. Figure 6, shows digital system network development scenario. In this context, the study establish the concept of crowd sourcing to update the database. Figure 7 shows the development scenario of implementation in the class. At this scenario, the learning was running comfortable.

Figure 6: Development scenario 1
Computer-based Learning (CBL) is the learning that is entirely using computers. As shown in figure 7, students face to face and interact directly with the android tablet. In order to use computer learning, students must be able to operate an android tablet, either hardware or software. The teachers are given directions on where and how to use the android tablet in learning. Educational software (application) will display improved cognition that allows to sharpen cognitive ability through android tablet app. The classroom will also be equipped with a low power projector and shelves for storing android tablet after use while recharging the battery.

![Figure 7: Development scenario 2](image)

![Figure 8: Digital Education Repository](image)
Figure 8 is a mockup of Digital Education Repository that will be install on android tablet. The available contents can be used such as videos, presentations, applications, and electronic books. It offers a few options like share, download or view/play a contents.

CONCLUSION

This study explores the development of digital education in Maratua Island. It is very important for the empowerment of small islands in Indonesia. Maratua Island has a prospective potential for tourism area. It is important to improve the quality of education as well. The concept of digital education will facilitate the teaching-learning process. Systems and applications that are built will continue to be evaluated for future improvements. In the next process, working with local government, industries, and other partners will continue to develop digital education system on Maratua Island.

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Adult educators’ ICT competence and ways for its development

Norbert GRÜNWALD
Hochschule Wismar, Wismar, Germany
norbert.gruenwald@hs-wismar.de

Julija MELNIKOVA
Klaipeda University, Klaipeda, Lithuania
julija.melnikova@ku.lt

Andreas AHRENS
Hochschule Wismar, Wismar, Germany
andreas.ahrens@hs-wismar.de

Jeļena ZAŠČERINSKA
Centre for Education and Innovation Research, Riga, Latvia
knezna@inbox.lv

ABSTRACT

In the era of digital economics, adult educators’ ICT competence is of high research interest as adult educators are the key players in fostering adults’ use of ICT in a variety of situations. The purpose of this article is to outline a theoretical framework on developing of adult educators’ ICT competence. The research took place in three countries – Germany, Latvia and Lithuania (further on “partner countries”) in the boundaries of the project “Adult educators’ ICT competencies”. The article provides a theoretical insight on main concepts in ICT education covering the aspect of challenges of ICT teaching and learning in adult education. Approaches and methods used to support ICT teaching and learning in adult education are introduced as well. The implications of the article could be useful for university educators, who seek to educate students future adult educators most effectively with a real intention to become digital innovators.

Keywords: ICT competence, Adult education, adult educator, formal education, non-formal education, informal education

INTRODUCTION

In partner countries the term “adult education” means a combination of educational acts addressed to adult people with several aims, among which:
- lifelong learning;
- second chance to complete own curriculum studies;
- basic knowledge useful for the integration into labour market;
- update knowledge aimed at a professional retraining;
- other non-formal training.

Therefore, adult education is based on the fact that all adults need to update and improve their skills and competences. The adult education in partner countries is addressed to young adults from age 16 and up to achieve second level certificate, and to adults from age 18 and up seeking for a job or already employed.

Generally speaking, the framework of adult education in partner countries can be classified in three main areas:
- formal provisions,
- non-formal provisions and
- self-education (informal learning).

Formal adult education includes general education, vocational education and training, and higher education. All these activities are carried out in the relevant institutions: gymnasiums for adults, special departments of vocational schools, specialized departments of the universities when learning ends with the granting of a diploma. The focus of non-formal adult education is to provide an individual with conditions for lifelong learning, meet the needs of cognition, upgrade already acquired qualifications and obtain additional ones. Self-education (informal learning) is a natural daily self-directed process of learning which may not necessarily be pre-planned; it is less organised and structured and may be driven by personal motives or by professional or family circumstances. Along the formal and informal adult education, there should be mentioned a new possibility of recognition of prior informally gained knowledge and skills. The procedure of informally gained skills formalization is quite popular in some universities that use their own methodologies. During the past several years, the Third Age University has gained popularity in partner countries.

1. ADULT EDUCATORS’ COMPETENCES

A regulation on “adult educator’s competence” does not exist in any partner country, including standards and a univocal adult educator profile. In Lithuania there was approved The Descriptor of Andragogue’s Professional Activities (2013) where andragogue’s professional competences are attributed to the three activity areas: education, management and research. In the Descriptor, there are also defined the necessary general competences. Education area competences are defined as ability to evoke, organize adult learning activities, training; management competences - analysis of adult learning assumptions in a particular situation, planning of new learning situations, assessment of teaching / learning outcomes; research competences - as a study of the theory of lifelong learning and analysis of theoretical feasibility and practical work. The necessary general competence is named as a set of abilities such as: ability to initiate, creativeness, ability to cooperate, communicate, work in team, ability to reflect an experience, learn and develop own capacities, update information and skills, etc. The ability to use ICT is also attributed to the general competence, especially for such capacities as information management, communication via IT tools, networking in national and international level.

In Germany and Latvia there are several types of adult educators, that is, adult educators with different profiles, depending on the training context in which they work, with different characteristics in terms of teaching-learning process (Zaščerinska, Aleksejeva, Aleksejeva, Andreeva, Gloźnina, & Zaščerinskis, 2015). Thus, there is no nationally accepted selection or definition of what competencies an adult educator has to possess, or a qualification descriptor for adult educators.
In general, in partner countries it is considered relevant that adult educators demonstrate competences in the following areas: technical knowledge (related to the training area), pedagogical knowledge (related to teaching-learning process, adjusted to each training context and appropriate to the specific group of adults with whom they work) and technological knowledge (or related to the field of digital literacy). In this last area, it is not so much knowledge that comes from the area of computing, but especially the ability to use digital technologies fluently and in a way adjusted to the purposes and contexts of its use (Melnikova, Grünwald, Ahrens, Pfaffenberger, Zaščerinska, 2017). ICT competences are not compulsory for trainers, therefore trainings on ICT tools depends on the trainers’ personal motivation and initiative.

2. ADULT EDUCATORS’ PROFILE IN PARTNER COUNTRIES

Profile is aimed at ensuring a real-world picture, profile includes portrait (Zaščerinska, Zaščerinskis, Gloņina, Aleksejeva, Sowinska-Milewska, Andreeva, 2016).

The article implications are based on the data collected through a questionnaire developed within the ”Adult educators’ ICT competences” project, in order to gather data about the use that adult learners make of ICT. The questionnaire consists of three blocks. The first block (questions 1-6) are sought to describe the population of adult education. The data collected allows describing the specifics of adult educators’ professional activity, their functions and important competences. The second block (questions 7-11) allow highlighting the importance of ICT in adult educators’ work. The data collected provides evidence on the importance of ICT in adult educators’ work as well as on the skills required by adult educators in order to apply ICT in various areas of their professional activity. Last block of the questions (11-13) focuses on the use of ICT in 6 domains of adult educators’ activity (planning of training, needs assessments, designing of training contents, preparation of training materials, delivery of trainings, assessment of the overall quality). The data collected allows assessing the use of ICT in these domains as well as distinguishing the competences to be acquired by adult educators in order to apply effectively ICT in all 6 domains.

The interpretive paradigm was used in the empirical study. The interpretive paradigm aims to understand other cultures, from the inside through the use of ethnographic methods such as informal interviewing and participant observation, and establishment of ethically sound relationships (Taylor & Medina, 2013). The interpretive research paradigm corresponds to the nature of humanistic pedagogy (Lūka, 2008, 52). The interpretive paradigm creates an environment for the development of any individual and helps them to develop their potential (Lūka, 2008, 52). The core of this paradigm is human experience, people’s mutual everyday interaction that tends to understand the subjectivity of human experience (Lūka, 2007, 104). The paradigm is aimed at understanding people’s activity, how a certain activity is exposed in a certain environment, time, conditions, i.e., how it is exposed in a certain socio-cultural context (Lūka, 2007, 104). Thus, the interpretive paradigm is oriented towards one’s conscious activity, and it is future-oriented (Lūka, 2007, 104). Interpretive paradigm is characterized by the researcher’s practical interest in the research question (Cohen, Manion & Morrison, 2003). The researcher is the interpreter.

The exploratory type of the comparative study (Phillips, 2006 was applied within the present empirical study. The exploratory type of the comparative study aims to generate new hypotheses and questions (Phillips, 2006). The exploratory methodology proceeds (Phillips, 2006) as shown in Figure 18:

- ‘conceptualisation’ in Phase 1,
- detailed description of educational phenomena in the countries to be investigated, with full attention paid to the local context in terms of its historical, geographical, cultural, political, religious, and linguistic (etc.) features in Phase 2,
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- the data collection in Phase 3,
- explanation through the development of hypotheses in Phase 4,
- re-consideration of the initial questions and application of the findings to other situations in Phase 5.

**Figure 1: Phases of the exploratory type of the comparative study study.**

191 respondents from partner countries took part in the survey. Most of them are women (81% - female, 19% - male). The major part of survey participants belongs to the age group between “41-50 years old” (42.9%). The distribution among the age groups (“31-40 years old” and “50 and more”) is almost equal (19% and 22% respectively). It is important to mention that the sample is represented at least by younger adult educators (age group “20-30 years” – 9%). Survey participants are distributed almost equally between the sectors of adult education they are involved in: 61% of respondents - involved in non-formal education; 52% - in formal education; 38% subsequently in informal adult learning.

As respondents were able to choose several answers, it could be presupposed that some of them are involved as in formal as in non-formal or informal education sectors.

The sample of respondents in Germany was mostly represented by female (67,86%), the major part of the survey participants had an age between 41 and 50 (35,71%). Almost half of the respondents have an experience of more than ten years as adult educator (42,86%) and just over half have been working in formal adult education at the level of secondary education (53,57%) with young adults (50%) and socially disadvantaged adults (46,43%). Most of the respondents are teachers, members of training centres, university professors, operators of job placement offices, job experts, business experts etc. The German adult educators, respondents of the survey, carry out the following activities: teaching German language and literature, teaching history, teaching ICT technology, teaching English language and business English, research in networking field, counselling, guidance, social economic project management, counselling on innovation, guidance and active
search on the labour market, laboratory tasks, teaching tourism laws, training planning, apprenticeship training, training in civil protection, training on start-ups, enterprise, canvas business models, business planning. The main difficulty they meet in their working experience is trainees’ shortage of interest and motivation; they acknowledged also inappropriate technology tools and innovation policies which prevent the growth and the competitiveness increase of German enterprises and the educational sector in general; difficulty to find a job for who has lost one; the disinterest of public administrations for adult education; shortage of ICT skills; difficult communication with foreign people; trainees’ different starting point; difficulty in planning courses linked to the labour market trends. Regarding the most important competences to successfully work with adults, almost all respondents indicated social competences (96,43%) and instructional (85,71%) competences as the most important, following ICT competences (67,86%), personal competences (64,29%), cognitive competences (53,57%) and andragogical competences (46,43%).

The sample of respondents in Latvia was mainly represented by females (62,2%). The majority of respondents (37,8%) were 41 to 50 years old (Zaščerinska, Aleksejeva, Zaščerinšis, Aleksejeva, Andreeva, 2018). Additionally, the majority of respondents was experienced as they have been working for more than 10 years in adult education. The majority of respondents (41,6%) stressed that his/her work in adult education was on formal education, while 36,3% was developing professional activity in different contexts (understood as formal education contexts, in specific in what refers to provision allowing a school education diploma and/or vocational education and training – both initial or continuing education) (See also Zaščerinšs, Andreeeva, Zaščerinšs, Aleksejeva, Glonina, 2017). Most respondents worked with employed adult learners (70%), while 50,3% with young adults, not inserted in the labour market, and 49,9% with unemployed adults. Most respondents pointed at problems and challenges related to adult learners. Among these, the lack of motivation of adult learners was the most referred, followed by the learning difficulties of learners (some connected to learning of school based contents such as Maths, Latvian or English as a foreign language, others of a technical kind, when contents were mostly linked to specific workplaces). Resistance to learning by adult learners was also referred, in specific when learners were affected by unemployment, and the fact that adult learners’ groups in several forms of provision were quite heterogeneous. The lack of use of ICT was also pointed at. Most of the respondents considered that social competences (82,2%), teaching competences (68%) and digital competences (58,9%) are decisive for being successful as an adult educator. Furthermore, we can observe that digital competences were chosen by 36,9% of respondents as being competences they would like to improve, as adult educators, followed by social competences (23,7%) and teaching competences (15,8%). Overall, the data reveals that digital competences are considered of upmost relevance by adult educators.

The sample of respondents in Lithuania was mainly represented by female (81%), this tendency describes the population of adult educators in Lithuania, which is typically feminine. The major part of survey participants belongs to the age group between “41-50 years old” (42,9%). The tendency again reflects the situation in adult educators’ population in Lithuania, which is typically represented by elder persons. This fact testifies the presumption that adult educator’s profession in Lithuania is aging – younger people should be attracted to it. Respectfully, the major part of respondents (81%) has experience of more than 10 years in adult education. Survey participants are distributed almost equally between the sectors of adult education they are involved in: 61% of respondents - involved in non-formal education; 52% - in formal education. The sample of respondents is mostly represented by those working in continuing adult education (38,1%) and non-formal adult education (33,3%). The majority of survey participants (76,2%) pointed that the target group they work with are adults between 25-60 years old. To sum up, it could be said that most of
the Lithuanian respondents are teachers from adult schools, vocational training centres, university professors, etc. The Lithuanian survey participants carry out the following activities in their sector: lecturing and training, individual counselling, tutoring and coaching, preparation of learning materials, career guidance, teaching a subject, planning and organising a non-formal adult education, attracting new learners, marketing activities, coordinating non-formal adult education activities in a district, research on the quality of adult education, organizing adult education events (seminars, job-shadowing, peer-learning etc.), working with a community, informing on adult education opportunities management and dissemination, cooperating with stakeholders (labour market office) and developing adult education programmes, developing and implementing projects in adult education, creating a learning environment etc. When identifying the major problems in their professional activity, the Lithuanian survey participants recognized the lack of skills to work with digital devices (such as smart board and tables) and to apply them in the learning process. Besides, the informants stressed the need for IT competence in order to apply technologies in planning and assessment of the learning process, working with learners, developing learning resources. Regarding the most important competences for successful work with adults, almost all respondents indicated ICT competences (85.7%), social competences (81%), andragogical competences (81%) as the most important, following by personal competences (71.4%), instructional competences (61.9%) and cognitive competences (47.6%).

3. ICT USE AND IMPORTANCE
The second block of the questionnaire allowed identifying the need for ICT and their importance in adult educators’ work in partner countries.
Almost all of the respondents in partner countries believe that the role of ICT in adult education is important and almost all agreed that ICT enhance the effectiveness of the adult learning. Concerning the implementation of ICT competences and tools, almost the two thirds of the respondents in partner countries always use ICT in their job.
The major part of the respondents in all partner countries uses ICT for browsing / searching the internet to collect information to prepare learning materials; to communicate online with adult learners; for browsing or searching the internet to collect learning material or resources to be used by adult learners during the study process. Other main activities relate to downloading / uploading/browsing material from virtual learning environments / learning platforms; preparing exercises and tasks for adult learners; using applications to prepare learning material / presentations for educational process, etc. Between “other answers” respondents mentioned “use of certain training programmes or applications for learning purposes”, “home assignments with certain programmes” etc.
Major part of the respondents in partner countries considered important using ICT in peer learning communities or group work and also using specific equipment (e.g. interactive whiteboard, laptop, etc.). Moreover, survey participants in partner countries considered important using ICT in learning (how to create websites/home page, video conferencing, etc.); subject-specific ICT use: tutorials, simulations, etc.; multimedia (digital video, audio equipment, etc.).

4. ICT USE IN THE 6 DOMAINS
The third block of the questionnaire was sought to highlight the tendencies of ICT use in the 6 domains.
Most of the respondents in Germany consider “how to use ICT in learning (subject-specific ICT use: tutorials, simulations, etc.)” as the most important ICT skill, followed by “how to use multimedia tools (digital video, audio equipment, etc.)”, “how to use specific equipment (e.g. Adult educators’ ICT competence and ways for its development
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interactive whiteboard, laptop, etc.), “how to use internet in the learning process (e.g. how to create websites, video conferencing, etc.)”, “how to participate in peer learning communities or group work with other adult educators” is judged less important. Regarding the ICT use in the six competence areas of an adult educator, ICT are often used in: “delivering the course” (100%), followed by “planning the training content” (82,35%), “designing training content” (70,59%), “developing training manuals, handouts, and exercises” (70,59%) and “evaluating the training results and assessing the quality of the training course” (52,94%). On the other hand, ICT are little used for “needs assessment”. The areas in which the respondents would like to get more training are: ICT use in the delivery of the courses (47,06%), ICT use in the assessment of adult learners’ needs (47,06%). Regarding the most widely used ICT tools, respondents indicated both HW technologies, such as computer, tablet, network, beamer, interactive whiteboard, and SW technologies such as e-learning platforms (Moodle), applications to create and delivery training content (PowerPoint, Video editor, Microsoft Word, YouTube, Web site, databases, MOOC etc) and social networks (WhatsApp, ResearchGate, etc.). In the future some respondents would like to use ICT to promote interaction and real-time feedback in the classroom, and Augmented and Virtual Reality tools.

In Latvia 93,5% of survey participants use ICT for planning education and training contents; 82,2% for assessing adult learners needs; 94,2% for designing education and training content. The use of ICT for the assessment of adult learners needs (82,2%) and for evaluation and assessment purposes (82,5%) are the lowest results, so these may be two areas that may merit particular attention in terms of concrete proposals on what can be done with ICT in the education and training course to be developed. When asked to specify the areas in which respondents would like to obtain further training in digital technologies, the answers show three areas that stand out. Firstly, the use in the development of activities and practical exercises are emphasized, secondly, the use in the design of training contents, and, finally, the use during the implementation of the training.

In Lithuania the percentage of “often using ICT” in each area is of: 74,9% in designing of training content; 63,16% - planning of the training content; 57,21% - using ICT in delivery of the course; 49,4% - developing training manuals, handouts, and exercises. In planning of the training content, Lithuanian participants would like to be able to use various virtual environments (as Moodle), open educational resources, digital learning platforms, special learning applications, Google Apps, etc. In the needs’ assessments, survey participants would like to be able to use digital questionnaires, digital needs assessment tools, Google Apps, etc. In designing training content, adult educators from Lithuania would like to be able to use open educational resources, Moodle, Google Apps. In developing of training materials, informants would like to be able to use Moodle, various graphical-textual tools. In delivery of courses respondents would like to use digital devices, applications for learning, virtual learning environments. In evaluating of the learning process, they would like to be able to use special digital tools. The areas in which the respondents would like to get more training are: 66,7% ICT use in the evaluation of the training results and assessment of the quality of the training course; 61,5% ICT use in the delivery of the courses; 47,6% ICT use in the planning of training content; 52,4% ICT use in the assessment of adult learners’ needs; 66,7% ICT use in the designing of the training content; 57,1% ICT use in the development of training manuals, handouts, and exercises. The most used ICT tools are internet, PC, e-learning platforms and interactive whiteboard.

CONCLUSIONS AND RECOMMENDATIONS
The results obtained in all partner countries indicate that ICT competences are considered important to adult educators participating in this survey. In fact, a large majority of respondents agreed that
digital technologies facilitate adult learning and indicated that they often used ICT in their practices of education and training. With respect to the other competences stated, the digital competences are ranked in the third position with more than a half of the answers. However, when asked about the role that digital technologies have play in adult education in all partner countries, the vast majority perceives that ICT are very important or just important.

It results by the survey that the shortage of ICT skills is not considered as a big issue, but it is considered however an important issue to enhance trainers’ and trainees’ competences. Furthermore, the respondents recognize that they lack ICT skills and indicate that they would enhance their competences, mainly in improving their understanding of the use of ICT in the evaluation of the training results and assessment of the quality of the training course.

Respondents in partner countries stated that the three most important skills for an adult educator are: how to use specific equipment, how to use ICT in learning, and how to use multimedia. This research finding, together with their preferences to be trained in ICT (relative to the 6 domains), should be taken into consideration for the development of the next outcomes of the project, especially in the preparation and delivery of the modularized training program. Participants affirmed that they are willing to be trained in all the ICT domains with a very similar interest, but most notably in: designing of the training content, delivery of the courses, and development of training manuals/ handouts/ exercises - in that order.

Validity and reliability of the research results have been provided by involving other researchers into several stages of the conducted research. External validity has been revealed by international co-operation as following:
- the research preparation has included individual interdisciplinary consultations given by other researchers, and
- the present contribution has been worked out in co-operation with international colleagues.

The following new research question has been formulated: What are the modules of training programme for the development of adult educators’ ICT competence?

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Adult educators’ ICT competence and ways for its development

Norbert GRÜNWALD, Julija MELNIKOVA, Andreas AHRENS, Jelena ZAŠČERINSKA
Innovative Graphic Presentation of Theoretical and Conceptual Frameworks (TF & CF): an Option to Explore in the Built Environment Research Education

Ruben Ndihokubwayo
Cape Peninsula University of Technology, Cape Town, South Africa
ndihokubwayor@cput.ac.za

ABSTRACT
Purpose: The aim of this research is to identify at what extend TF & CF have been incorporated into built environment theses, and propose a generic graphic model incorporating basic components of TF & CF. Methodology: A qualitative method was adopted whereby purposively selected social science related research theses conducted from 2005 to 2017 in the Department of Quantity Surveying and Construction Management at the Cape Peninsula University of Technology were analysed. The proposed generic graphic form was designed incorporating basic features of TF & CF including the gap of knowledge and variables. Findings: It was revealed TF & CF were not incorporated into built environment theses; except few cases from recently completed theses. The proposed model provides a comprehensive breakdown showing various components of TF & CF; respectively, the theoretical stance behind the study; and the paradigm of the study including the gap in knowledge, and variables to be computed. Conclusions: The proposed model results from the effort for innovation towards the improvement of built environment research education. The exploration of this option will hopefully result into improved quality standard and shorter time for completion of research theses. Limitations: At this exploratory stage, few recently completed theses were analysed. The efficiency of incorporating graphic presentation of TF & CF into research studies will further be investigated.

Keywords: Conceptual framework, gap in knowledge, theoretical framework, variables.

INTRODUCTION
The incorporation of TF & CF is not an easy task as it may be thought of. Anfara and Mertz (2014) realise both students and experienced researchers have trouble for identifying and using theoretical frameworks. TF & CF are important components of a research given that they provide an in-depth understanding of the research from the beginning throughout its completion. Anfara and Mertz (2014) indicate theoretical framework provides a lens for seeing and making sense of what to do in the design and conduct of the research study. Therefore, the expression through graphic presentation may be viewed as a useful instrument for disseminating a research problem and its anticipated remedial provisions. Graphic presentations are referred to as visual features such as graphs, charts, figures, tables, diagrams, photographs, and illustrations GPEM (2017). Given the importance derived from TF & CF, their presentation in graphic form constitutes and added advantage than in plain sentence form. Darbin (2004) indicates graphs can present certain types of information such as complicated relationships and sequences of events more clearly and in a less space than the same information would require a sentence form. If properly designed, graphic presentation conveys an unambiguous message understood by a wide range of spectrum of audience regardless its level of literacy. The communicator of the information has to make sure the audience will be able to interpret the conveyed information and make use of it.
The expression through graphic presentation is intended to convey various types of information across various industries. Darbin (2004) believes graphs and figures are often convenient and helpful to present and clarify information. For example, architects express themselves by drawing plans which are later easily interpreted by contractors to erect buildings. Road signs and sign posts convey useful information to road users to drive and arrive safely at their destination. In postgraduate research education context, students undertake research projects which will form the basis for evaluation. In this context, the student is a communicator, and the main audience is the examiner, and readers who will be interested in the subject matter. The better the research project will be understood. In this regard, innovative ways of designing graphic presentation brings not only a clearer understanding of the research by the audience; but also, the designers themselves speed up their research project.

The South Africa higher education is hampered with the low throughput and high attrition at master and doctoral levels. The throughput is the time period it takes students to complete an academic course counted from the year they first enroll into such a course to the year they graduate. The attrition is abandonment rate of students registered into an educational system. Mouton (2016) is concerned that only 39% of doctoral students graduate after 7 years beyond a normal time of two years; it may even take 12 years to complete a doctoral degree. Herman (2011) complains that there are consequences of student attrition as it becomes the cost to the society in terms of the loss of the knowledge and talent of non-completers and there are costs to the non-completers themselves. While there might be many factors attributed to low throughput and attrition, the know-how of conducting the research is a non-negligible contributing factor. Mouton (2016) reports results from a survey conducted at the university of Stellenbosch which sought to find out at what extent doctoral students require supervisor’s guidance. It was found students require guidance on the development of their research proposal (51%), on organising thesis (49%), on academic writing (45%) and even in choosing their thesis topic (44%). Most impliedly, master students require more attention than doctoral students. It is therefore anticipated that the design of graphic TF & CF constitutes an incredible educational tool to support the supervision of research students. Subsequently, the use of graphic TF & CF can possibly increase the throughput period and reduce the attrition rate. In fact, the design of TF & CF brings a better understanding of the direction ahead in a research project.

RESEARCH DESIGN AND EXPLORATORY STUDY
The notion of TF & CF in built environment research studies are rarely incorporated into research studies at universities of technology. Most obviously, it is believed that research undertaken at technical universities tend to focus on design of products. However, this is not always the case when the research focuses on social science topics. In social sciences, theories are classified in individual, group behaviours. Anfara and Mertz (2014) indicate in social science, theories are generally drawn from disciplines such as political science, economics, anthropology, sociology, and psychology. The research on social science topics often requires the incorporation of TF & CF. Available literature is not clear enough to show the graphic difference between the TF & CF. Even though, Olivia (2011) declares there is a distinction between TF & CF. Some social science related research projects carried out in the built environment studies do not even incorporate TF & CF. An exploratory study was carried out at Cape Peninsula University of Technology in the Department of Quantity Surveying and Construction Management to find out whether research projects incorporated TF & CF. Purposively sampled theses carried out from 2005 to 2017 were analysed. Table 1 displays the list of sampled theses. From eleven sampled theses, only two had explicitly discussed and graphically presented CF. These findings reveal that TF & CF have not been widely adopted in social science related built environment research studies. It is therefore imperative to provide
guidance on how to design TF & CF. Resultantly, both students and supervisors will benefit from this research as they will gain a better understanding on how to design TF & CF.

DESIGN OF TF & CF

Regoniel (2012), Zamboni (2018), and Otundo (2018) concur there is a difference between TF & CF. On one hand, Fellows and Liu (2008) refer to theoretical framework as review of the literature related to theories of the subject under research and these theories form the basis for setting hypotheses and testing the relationships of variables. Regoniel (2012) indicates a theoretical framework provides a general representation of relationships between things in a given phenomenon. Otundo (2018) adds that a theoretical framework provides a large, overarching structure of ideas that the researcher can draw from in beginning to analyze a phenomenon. Olivia (2011) indicates a theoretical framework is based upon established theories that have already been tested. On the other hand, Olivia (2011) states the conceptual framework, also called the research paradigm, provides the direction that is missing in the theoretical framework, which displays the variables to be tested, delineates the input, and also the output of the research project. Given that various authors concur on the difference between TF & CF, it is imperative to further use graphic presentation to uncover such a difference. Furthermore, Regoniel (2010) clearly explains that conceptual framework should clearly show the relationship between specific variables identified in the study.

Etymologically, the theoretical framework differs from the conceptual framework although they are interlinked. A theory is a Greek word theòria meaning contemplation. A theory is a reasoned set of ideas that is intended to explain why something happens or exists. A concept or conception is a word derived from the verb to conceive meaning concipere in Latin. From Figure 1, a distinction is shown between the theory and the concept. It is assumed that a theory is constituted with many layers. A researcher may decide to confine the research project to selected layers of the theory. However, the theory should be directly linked with the concept. The conceptual framework is designed through reviewing the literature related to the theory; henceforth; the gap which is not covered by existing literature is subsequently identified. TF & CF can be designed as two separate figures. The theoretical framework reveals aspects of the theory or practice which will be explored. For example, the research on motivation theory should be confined to various aspects of the theory related to the topic under research. However, it should be noted that not all topics of research in the built environment are linked to a pure theory. Rather, the research may focus on improvement or innovation within existing practice, or policy. While Figure 1 displays a generic form of TF & CF, it is imperative to design two distinct figures detailing various aspects.
Table 1: Analysis of TF & CF within theses

<table>
<thead>
<tr>
<th>Topic</th>
<th>Year</th>
<th>Theory, reviewed body of knowledge</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>The theory and practice of procurement systems and affirmative procurement policy</td>
<td>2005</td>
<td>Affirmative procurement policy; and state tender board regulations</td>
<td>TF &amp; CF were not explicitly presented</td>
</tr>
<tr>
<td>Older construction worker – a study of related underlying causes and estimated costs</td>
<td>2008</td>
<td>Accident causation theories, agencies involved in construction injuries and cost associated to injuries, construction health and safety related training</td>
<td>TF &amp; CF were not explicitly presented</td>
</tr>
<tr>
<td>An investigation into the effectiveness of the inspectorate in the South African home industry</td>
<td>2008</td>
<td>Housing inspection; building standards and regulations and associated enforcement measures</td>
<td>TF &amp; CF were not explicitly presented</td>
</tr>
<tr>
<td>An analysis of the impact of variation orders on project performance</td>
<td>2008</td>
<td>Provisions for administration of variation orders, waste and non-value adding activities</td>
<td>TF &amp; CF were not explicitly presented</td>
</tr>
<tr>
<td>The impact of prefabrication and pre-assembly on construction health and safety in South Africa</td>
<td>2010</td>
<td>Traditional construction methods and associated factors leading to poor health and safety; and prefabrication and pre-assembly technologies</td>
<td>TF &amp; CF were not explicitly presented</td>
</tr>
<tr>
<td>An analysis of the causes and impact of rework in construction projects</td>
<td>2012</td>
<td>Procurement and tendering methods, waste arising from rework, costing of rework</td>
<td>TF &amp; CF were not explicitly presented</td>
</tr>
<tr>
<td>Current maintenance strategies of university building facilities in the Western Cape, South Africa</td>
<td>2013</td>
<td>Building performance parameters; and maintenance management</td>
<td>TF &amp; CF were not explicitly presented</td>
</tr>
<tr>
<td>Framework for effectiveness management of construction cost on building project delivery in South Africa</td>
<td>2014</td>
<td>Principles of construction management; and cost management</td>
<td>TF &amp; CF were not explicitly presented</td>
</tr>
<tr>
<td>Factors contributing to the successful mentorship of women in the South African construction industry</td>
<td>2015</td>
<td>Mentoring function; and mentor-mentee relationships</td>
<td>TF &amp; CF were not explicitly presented</td>
</tr>
<tr>
<td>Supervisory motivational strategies to improve productivity of construction workers</td>
<td>2016</td>
<td>Construction worker’s productivity, and motivational strategies</td>
<td>Only CF was graphically presented. The adjective “conceptual” and “theoretical” framework was interchangeably used.</td>
</tr>
<tr>
<td>Framework for the effective implementation of total quality management in the maintenance of tertiary institution buildings in South Africa</td>
<td>2018</td>
<td>Total Quality Management (TQM); and maintenance management</td>
<td>Only CF was graphically presented, clearly showing the knowledge gap, and variables to be measured. It was used to draw the conclusions.</td>
</tr>
</tbody>
</table>
Innovative graphic presentation of theoretical and conceptual frameworks (TF & CF): an option to explore in the built environment research education.

Ruben NDIOHKUBWAYO.
CONCLUSIONS AND RECOMMENDATIONS

The study explored at what extent TF & CF have been incorporated into research theses undertaken in the department of Quantity Surveying and Construction Management. It was found few theses have incorporated TF & CF. The link between the designed TF & CF and their components were shown. While the incorporation of TF & CF into a thesis design is optional, it is recommended that the researchers choosing graphical presentation of TF & CF incorporate basic features such as gap of knowledge and variables.

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Games as an Activating Tool in the Education of Students

Barbara KRYK
University of Szczecin, Szczecin, Poland
krykb@wneiz.pl

Grażyna LEŚNIEWSKA
University of Szczecin, Szczecin, Poland
power2007@o2.pl

ABSTRACT
The aim of this article is to indicate the role and importance of games as a tool for activating students in the modern education process. The goal was to be achieved through presentation of the opinions of students of the Faculty of Economic Sciences and Management at the University of Szczecin (Poland) covered by this method of education, as well as through examples of games developed by them. The research methods used were: desk research, a diagnostic survey in the form of a questionnaire addressed to students (distributed during classes and sent via e-mail), visualization of games prepared by students, and deduction. The research carried out in 2018 made it possible to determine: (1) the effects of using games on the student when acquiring knowledge, skills and social competences that determine their role and importance in the learning process, and (2) advantages and disadvantages resulting from their application at universities. Based on the results of the study, the recommendation was formulated to popularize the use of games during various classes conducted by universities, and an attempt was made to answer the question of why games are so rarely used in the classroom.

Keywords: students' education, games, effects of games on students' opinion, visualization of student games.

INTRODUCTION
The quality of education at universities is not satisfactory, and its improvement requires a variety of different activities and changes, including in the process, methods and educational tools. One example of these tools are games that have not only served for entertainment for some time, but – as research shows (e.g. DeMarco, Lesser, O'Driscoll, 2007) – they can support the development of various competences, knowledge and skills. In addition, they increase the attractiveness of didactic classes from the point of view of students, increasing their involvement in the education process - in accordance with contemporary trends in education - which affects its effectiveness and quality (Kamiński, 2013, Kapp, 2012; Sheldon, 2012). The importance of games is growing, as the commonly used conventional lectures and exercises do not fully respond to the needs and expectations of students and the labor market in the modern times. Therefore, the aim of the article is to indicate the role and importance of games as a tool for activating students in the modern education process. The issue of gamification raised in the article, is part of a relatively new trend in research and reflection on modern methods and tools of academic education as well as studies on the quality of academic education. The practical dimension of the results of the presented research can be seen in the realization of a campaign popularizing the use of educational games in Polish academics. The goal was to present students' opinions on the games, the effects of their use in class, and the advantages and disadvantages of their use. In addition, examples of games developed by
students are presented as a direct result of their activity in the classroom. The research carried out in the period from May 15 to June 15, 2018 made it possible to formulate recommendations regarding the popularization of the use of games by universities, and to answer the question of why games are so rarely used in higher education.

**METHODOLOGY OF TESTS AND RESEARCH**

The research was carried out by means of a diagnostic survey in the form of a questionnaire addressed to students of the Faculty of Economic Sciences and Management at the University of Szczecin. The survey was conducted during classes and questionnaires were distributed in class and sent via e-mail. The questionnaire contained 9 multiple choice questions (3 closed, 6 semi-open with the possibility of adding one’s own example) and three personal data questions. Students from the following majors were asked to complete the survey: Economics, Property Management, Economics and Law, Journalism and Media Management, and Public Health, where classes using educational games (both purchased and those to be created by students) were conducted. In total, there were 115 students in the study groups. 68 students completed the survey, which constituted 59.1% of all respondents. Of these, 61.8% were first-degree students, and 38.2% were second-degree students. Among the respondents, 3% were students of Economics (course: Language Savoir-Vivre), 48% of Real Estate Management (course: Psychology), 13% of Economics and Law (course: Language Savoir-Vivre), 21% of Journalism and Media Management (course: Creativity of the Leader in the Group), and 15% of Public Health (course: Interpersonal Communication). The majority of respondents were constituted women (82%), the remaining 18% were men. The gender ratio is related to the fact that: (1) women constitute the majority of the Economics programme, and (2) women are more compliant and willing to help, even when completing the questionnaire.

**STUDENTS' OPINIONS ON EDUCATIONAL GAMES - RESEARCH RESULTS**

The effects of applying and creating educational games for students

As already mentioned, the use of properly prepared games in the education of students allows them not only to increase their involvement in the educational process, but can also help overcome the significant shortages of traditional teaching methods, primarily in training practical skills and attitudes, as well as acquiring knowledge. Meanwhile, most teachers are not aware of the effects of using games, both for students and universities, hence it is worth presenting them.

The survey began with a general question about playing social games, so that students would be aware of what type of games the study involved. Almost all respondents (98%) answered this question positively, only 2% answered negatively. In the context of the above, the students were asked whether the games were used as a tool to support the learning process in class at the university. 95% of respondents confirmed the use of games in class and only 5% answered negatively. It would be a very satisfactory result, if not for the fact that the majority of the respondents (89%) played games within 1-2 courses, and only 11% played games at 3-4 courses during their studies. Nobody had a chance to benefit from more frequent use of in class games (Figure 1). Considering that there are on average 12 to 20 courses during one year of studies, the indicated number of courses during which games was used was relatively small, which confirms the rarity of use of this educational tool. The reasons for this can be seen in the fact that: (1) teaching skills have not been appreciated in the professional development process of professors, which discourages the effort to use non-standard teaching methods, (2) limited hours spent on implementation of a typically

1 The Economic and Legal major is conducted in consultation with the Faculty of Law, Journalism and Media Management - with the Faculty of Humanities, Public Health - with the Department of Physical Culture and Health Promotion.

2 These were the classes conducted by the authors of the present article.
extensive curriculum resulted in the renouncement of methods/tools for engaging students that would be more time-consuming than traditional forms, and (3) difficulties in financing the purchase of educational games using existing funding for scientific research (so-called statutory activities) could not be spent for didactics. Therefore, there were no favorable conditions for using games in the teaching process.

Even greater effects than standard gamification⁢, based on the use of ready-made games, result from their creation by the students themselves, which further develops students' potential and creativity, teaches responsibility, independence, and logical thinking, and influences the voluntary exploration of the problem they are dealing with (Leśniewska, Sokolińska, 2018). This is why students were asked if they had created a game for the purposes of the courses at the university. All respondents replied that they had the opportunity to develop a game only once, during the courses conducted by the co-author of the present article. Therefore, creating what we can call “subject games” by students is even less common than standard gamification. This may be related to the organizational constraints mentioned above, accompanied by the lack of updating skills in the field of methodology (among others, the use of modern education tools) of teachers who are not specialists in pedagogy. Regardless of the form of gamification used, it brings effects in the education of students when acquiring knowledge, skills and competences, which is why students were asked to define them. As far as knowledge was concerned, there were 5 alternative effects to choose from and the possibility of adding one’s own proposed in the “other” position. However, no student entered anything there. From the given answers, students chose four (Figure 2).

Gamification is the use of mechanics known from various types of games (didactic, strategic, simulation, fictional or computer) to modify the behavior of people in non-gaming situations in order to increase their involvement. The technique is based on the pleasure that comes from overcoming the next achievable challenges, rivalry, cooperation, etc. (Tkaczyk, 2012).

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Figures:

- Figure 1: Number of courses during which the games were used in the learning process.

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The results do not add up to 100%, because respondents could choose more than one answer.

**Figure 2: Effects on broadening the knowledge indicated by the students.**

Most of the respondents indicated that the games: “constitute a good tool for summarizing classes” (88%). According to 78% the games “facilitate the repetition of the material”, that is, help to consolidate the curriculum content acquired during the classes, similarly to traditional teaching methods, e.g. oral or written testing. The method of gamification, however, requires the teacher’s creativity and incentive, and dedication of more time compared to common standards. Fewer respondents (67%) indicated that the games “enable them to acquire new knowledge”, and even fewer (48%) that they “allow them to broaden their knowledge of a given subject”. The last two answers may suggest that some of the students did not show excessive willingness to self-develop or broaden the knowledge gained during classes, because with a limited number of didactic hours the teacher is never able to convey all subject knowledge during classes. This statement also confirms the results obtained by the authors of the article on the topic of academic tutoring, which resulted i.e. from too low quality of students in the field of the use of modern education methods, which further indicates the necessity of using modern educational methods and tools and, in general, raising the quality of education.

In the context of acquiring new skills, there were 8 effects generated by the games and the possibility of adding new examples. However, no student added an example. Of the possible answers, students chose seven (Figure 3). Among the skill effects, two groups of answers can be seen. One group with responses over 50% of indications, in which there were 4 effects: games “teach teamwork” (87%), “teach how to lose” (79%), “support the analysis of one’s own actions,” (69%) and “support rational thinking and inference skills” (53%). However, it is highly probable that, in this group, students had already gained the aforementioned skills by playing social games and, during the study, they could articulate them and realize the benefits resulting from overcoming challenges, rivalry, cooperation, etc. in connection with the pleasures resulting from gamification. The second group of responses with indications below 50% contained the following 3 effects: games “support cause and effect thinking skills” (47%), “teach management elements,” (37%) and “develop language skills” (35%).
The results do not add up to 100%, because respondents could choose more than one answer.

**Figure 3: Effects on acquiring new skills indicated by the students.**

The lower percentage of indications of effects in this group compared to the effects of the first group may be related to the level of knowledge and development of students who currently do not have in as much so-called general and non-specialist subjects in their curriculum, which results in limitations in knowledge that affect the skills of induction, deduction, and phenomena/processes identification. This is superimposed by reading culture, or rather the lack thereof, in young people growing up in the era of IT technology, and the “flood” of simplified forms of content generated by them. This causes, among others, poor vocabulary, and an inability to express and define. The consequence is the failure to realize certain phenomena/feedbacks etc., which require some thought to specify and articulate them.

In the area of social competences generated by the games, there were 7 effects to choose from and the possibility of adding one’s own examples. However no student offered an example. The respondents indicated six effects, which can also be categorized according to the percentage of indications into two groups of responses: above and below 50% (Figure 4). In the first group were the following effects were listed, ranked by the amount of the indicators provided: games: “raise awareness of the need to cooperate” (91%), “prepare for realization of projects” (79%), “teach decision making” (74%), and “teach planning” (62%). The second group indicated that games teach “ethical behaviour” (48%) and “responsibility” (43%). Thus, most of the respondents attributed greater importance to the effects of the first group associated with the action, and lower importance to the effects of the second group referring to the standards of conduct. This assignment of greater importance to something that is more specific and noticeable reflects the pragmatism of students, which may be related to their personal characteristics and the specificity of economic studies requiring high rationality and legitimacy in the so-called “real world.”
The results do not add up to 100%, because respondents could choose more than one answer.

**Figure 4: Effects on competences indicated by the students.**

To conclude, the effects perceived by students from the use of games confirm their importance in the process of education at universities. This application is supplemented with general student opinions on the subject of gamification in the classroom, which emphasize their role in this process (Figure 5). Analyzing the results, it can be seen that the majority of students perceive games as an attractive form of classes (99%), developing creativity (93%) and allowing them to broaden their knowledge (75%). In the comment section, they reported that they remember better and benefit more from the classes during which the curriculum is taught in a non-standard way. In addition, for about 2/3 of the respondents, the games were a tool which encouraged action and specific attitudes. Specifically: 67% indicated that they motivate them to make intellectual effort, 63% that they motivate them to study subject literature” and 62% that they “shape friendly attitude”. Therefore, 6 out of 8 alternative answers obtained an average percentage of responses over 76%, which proves the students' good opinion about the games and their role in education. The smallest percentages of indications were responses from the personality traits (psychology) shaped during games (“they allow students to learn the personality of the players” - 43%; they “teach control and patience” - 32%). The smaller significance attributed to these responses may be - as already mentioned -
related to the specificity of the studies and people who study them, which does not diminish the educational role of games.

**Advantages and disadvantages of using games at universities**

The use of games in the education process is also important for the university. Therefore, students were asked to indicate the advantages and disadvantage of using games during university classes. In the question about the benefits, there were 4 variants of the answer, and more than one option could be chosen (Figure 6). The students' opinions on the benefits resulting from the use of games during university classes were as follows: 99% indicated that classes conducted using games are “more attractive than traditional,” 89% that they “improve the quality of the relationship with the teacher conducting the subject”, 72% that they have a positive effect on the quality of education, and 67% that they allow students to achieve the goals of education. The average percentage of benefit indications was high and amounted to 81.6%, which shows the importance that students attach to games.

![Figure 5: Student’s opinion on using games at university.](image)

The results do not add up to 100%, because respondents could choose more than one answer.

![Figure 6: Advantages of using games at universities.](image)

This is also indirectly confirmed by their opinions about the disadvantages of games (Figure 7). Namely, out of 4 alternative responses – “they are an unnecessary element of classes”, “they are time killers”, “they do not have any effect on the quality of education”, “I do not see any disadvantages”– all respondents indicated the latter, which confirms that they perceive the use of games as superlative.
STUDENTS CREATE GAMES

In order to increase the effectiveness of games as a tool for educating students, it is worth reaching for games created by the students themselves. Creating games motivates students, forces them to process information more deeply, logically synthesize the information, and supplement and repeat material, which leads to permanent memorization of educational content (Leśniewska, Sokolińska, 2018). Below are examples of games developed by students (photo 1, 2, table 1).

The development of the game is one of the types of work that is part of the final assessment of the subject. The task is carried out in groups created depending on purpose and needs—either independently by students or by the teacher.

<table>
<thead>
<tr>
<th>Synthesis of the information about games</th>
<th>Aims</th>
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<tr>
<td>1. The „Negotiation dart” game was created on the basis of the mechanics of the game of darts. There are nine rounds of the game between negotiation teams. The team that has more knowledge and scores more points wins.</td>
<td>• supporting communication processes, • acquiring and consolidating knowledge in the field of negotiations, • teamwork, • experiencing emotions related to the...</td>
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2. The communication game „Psycholaba” engages participants and requires them to interact. Based on the mechanics of the game Pictionary.

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<th>behavior of negotiators.</th>
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<td>• supporting communication processes,</td>
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<td>• development of attentive listening skills,</td>
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<td>• increasing awareness of the role of various aspects of verbal and non-verbal communication,</td>
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<tr>
<td>• teamwork,</td>
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<tr>
<td>• development of interpersonal intelligence.</td>
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Developing a game requires more time and effort than standard preparation for classes, which improves the memorization of not only the form / tools of education, but also related content.

CONCLUSIONS AND RECOMMENDATIONS
The students’ opinions on the effects they gain from using games in the classroom (and within all the scopes related to the education process, including knowledge, skills, social competence), the generally positive perception of this learning tool, and the benefits that games generate for universities confirm not only their significant role and importance in the education process, but also the views presented in the literature on this subject. The use of games at universities is hindered by: insufficient knowledge of teachers and universities about the effects and benefits of using games, underestimating the skills and teaching effort of employees in the context of professional careers of professors, difficulties in financing the purchase of educational games from funds for statutory research, limited supply of educational games for students, and excess of curricular content in particular subjects in relation to the time devoted to their implementation, which limits the use of modern teaching methods and tools. In the existing situation, the dissemination of the use of games in the education of students requires undertaking organizational, financial and legal changes/solutions, both at the level of the Ministry of Science and Higher Education as well as at the universities themselves. It would be a worthy venture to provide teachers with training in modern methods and educational tools to promote their benefits, to make the funding of teaching aids more flexible, to create alternative sources of funds for this purpose, to take into account didactic achievements, to modify study programs to include activating methods of education, and to create instruments supporting the development of modern teaching tools for students, including games.

REFERENCES
ABSTRACT
The aim of the paper is to identify the level of students' knowledge and demand for tutoring in higher education institutions and their expectations towards it in the context of the requirements of the job market and the quality of education. To this aim, the paper presents: (1) a synthesis of the nature of tutoring and the relevant state of affairs in Poland, (2) opinions on tutoring of the students in the Faculty of Economic Sciences and Management at the University of Szczecin. The research methods used were: desk research, a diagnostic survey in the form of a questionnaire addressed to students (distributed during classes) and deduction. The research was carried out between January and May 2018. The research has enabled determining of the students' demand for this relatively new educational method in Poland and identifying their expectations about it, which indirectly suggests the motives for potential engagement of students in tutoring. The results obtained partly coincide with the results of Lucyna Przybylska's research on the motives of students' involvement in tutoring at the University of Gdańsk. Consequently, recommendations are made regarding the development of tutoring at Polish universities.

Keywords: academic tutoring, quality of university education, students' demand for and expectations about tutoring.

INTRODUCTION
Adequate education that will enable the acquisition of necessary knowledge and prepare people for proper functioning in society and the dynamically changing job market is a condition for meeting many different economic and social challenges. These include competitiveness and innovativeness of the economy, demography, job markets, level and quality of life in Poland, the requirements of a knowledge-based economy (KBE) as well as achieving the goals of the Europe 2020 strategy and Agenda 2030. Higher education and its quality play a special role in all this.

The quality of education in universities is not satisfactory and its improvement requires many different actions and changes, including in the process and methods of education. A vital role in the academic learning process is played by lecturers who, through their involvement and work, determine the behaviour and attitudes of students. They not only have an impact on the results achieved but also help in the transition through the entire learning process as well as in reducing the "costs" incurred by students in contact with the academic reality. The effects of the lecturers' work depend, among other things, on the teaching methods used. Commonly used conventional lectures and seminars do not fully meet the current needs and expectations of students or the job market. The current relationship between the university lecturers and students should, therefore, change mainly to increase the students' engagement in acquiring and expanding knowledge, skills, and competencies and thus improve the effects and quality of education. Students should be active and responsible participants in the learning process, not just listeners. If they are to have unconventional knowledge, enabling them to meet the requirements of the modern job market, they must look for it themselves. A personalised educational offer is helpful in achieving this goal. One of the methods
of individual approach is tutoring, which, due to its many benefits, can contribute to the improvement in the quality of education. In the context of the above and since tutoring is still a rare topic of empirical research in Poland, the **aim** of the paper is to identify students' level of knowledge and demand for tutoring in universities together with their expectations in the context of job market requirements and quality of education. The issues raised in the paper involve researching and reflecting on the method of tutoring and its usefulness in universities as well as studying the quality of university education. The practical dimension of the presented research results can be seen - as in Przybylska (2015) - in starting a campaign to promote this new method of education, based on master-student relations, in the academic didactic offer in Poland. The research methods used are desk research, a diagnostic survey in the form of a questionnaire addressed to students, and deduction. To this aim, the paper presents: a synthesis of the nature of tutoring and the relevant state of affairs in Poland and opinions on tutoring of the students in the Faculty of Economic Sciences and Management at the University of Szczecin (Poland). The study was conducted between January and May 2018 and enabled the formulation of recommendations regarding the implementation of tutoring in universities.

**TUTORING IN POLAND**

Tutoring is a teaching method based on regular individual meetings (tutorials) between a tutor and a student who independently prepares educational tasks and then discusses them with the tutor (Witkowska-Tomaszewska, 2011). The method is particularly effective in developing the students' potential and motivating them to work independently, which results in the satisfaction of both the tutee and the tutor. The intention here is to use the intellectual potential which is "hidden" in a human being. In other words, tutoring aims at understanding oneself and transforming "hidden knowledge" into "explicit knowledge" about oneself, one's capabilities, strengths, and dreams (Brzezińska and Rygielska, 2009).

Tutoring is a process the rhythm of which is determined by subsequent meetings. Depending on what the process focuses on, we talk about developmental or academic tutoring. Both types of tutoring are used at universities. Tutoring, as a method of individualised teaching, is based on a relationship of partnership and trust and involves a process of discovering the strengths of the tutee (enhancing talents, knowledge and skills) instead of finding weaknesses and demonstrating ignorance (Witkowska-Tomaszewska, 2011). It thus constitutes a qualitative change in student education, directly implementing the recommendations of the Ministry of Science and Higher Education and the Ministry of National Education regarding the need to improve the quality of education.

In the academic year 2017/2018, the option to study using the tutoring method existed only in six Polish higher education institutions, and only 70 academics were conducting classes using this method. The fields of study using academic tutoring include Finance and Accounting, Economics, Investments, Management, Oceanography, Geography, Journalism and Social Communication, Psychology, International Relations. The proposed topics of the tutorials are: corporate finance,

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1 In developmental tutoring, tutors work around values, talents, and goals. They help to introduce the tutee into the area of reflection and communication on the subject of fundamental values and virtues. The aim of the tutor is to teach the tutee to function authentically, independently, consciously, and consistently, rather than adapt superficially or conformistically to some external pattern.

2 Academic tutoring emphasizes the importance of the educational process itself, refers to the assumptions of liberal education, in which the emphasis is placed on the skill of critical thinking, creative analysis of knowledge, precise expression of own and other people's ideas, logical argumentation and discussion (Czekierda, 2009).

3 These were: University of Economics in Katowice, University of Lower Silesia in Wroclaw, Cracow University of Economics, University of Gdansk, Jan Długosz University in Częstochowa, University of Social Sciences in Warsaw.
investment effectiveness, public sector, around entrepreneurship, management areas, globalisation and contemporary challenges, water pollution, zero zone, water and humans, marine biotechnology, geography of religion, quality of communication and its determinants, marketing communication, advertising communication, Public Relations and applied psychology (results of own research - Kryk and Leśniewska, 2018). At the University of Szczecin, only one academic (accounting for 0.5% of all teaching staff) has held formal tutoring qualifications for several years (co-author of this article); however, these qualifications are not used because there is no option to work using the tutoring method. Meanwhile, in December 2017, the Ministry of Science and Higher Education launched a project titled "Masters of didactics", whose main goal is to develop and implement new solutions in the training of tutors and education through tutoring in cooperation with leading foreign universities (located in the first hundred of the Shanghai ranking). This means that high expectations are placed on tutoring in relation to obtaining positive effects from its application in the process of raising the quality of education. Hence, it is worth identifying whether students are really interested in studying with the use of this method.

RESEARCH METHODS AND SAMPLE
The research was carried out by means of a diagnostic survey in the form of a questionnaire addressed to the postgraduate students of the Faculty of Economic Sciences and Management at the University of Szczecin. The questionnaire was distributed during classes and the difference between the concept of a mentor and a tutor was briefly explained to students because they were asking if these concepts were identical. The questionnaire contained 7 multi-select multiple choice questions, 2 semi-open questions, and 4 demographic questions. Students on the following programmes were asked to complete the survey: Economics, Finance and Accounting, and Management. There were a total of 274 students in both years of these programmes and 84 people completed the questionnaire. This accounted for 30.1% of all respondents, of which 37% were first-year and 63% second-year Master's degree students. Among the respondents, 31% were students of Economics, 55% of Finance and Accounting, and 14% of Management. The age range was 22-26 years. Among the respondents, the majority were women (82%) and the remaining 18% were men. The gender ratio is related to the fact that: (1) on the so-called economics programmes the majority of students are women, (2) men, more often than women, have already taken up work during their studies resulting in their more frequent absences from classes.

STUDENTS' OPINIONS ON TUTORING – RESEARCH RESULTS
Among the researched students, 2/3 (i.e. 56 people) did not know the terms tutor or academic tutoring. Only 1/3 of the respondents had knowledge on this subject. However, most students, i.e. as many as 90.5% (76 people) knew what a mentor is. Only 9.5% of respondents did not know this term. These results confirm that the tutoring teaching method and the related function of a tutor are not widespread. The fact that this method is rarely used at universities is also evidenced by the answer to the question: Have you heard about academic tutoring conducted at universities? Only 4 people (4.8% of the total) confirmed that they had heard about it in relation to the University of Gdańsk (UG), the University of Warsaw (UW), and the University of Szczecin (US). Indeed, in the first of these universities, tutorials had only been offered from the academic year 2014/2015, whereas in the second they did not take the form of regular classes as part of the study programmes but were offered as an activity to the students who were potential candidates for studies within the project. According to the authors, the mention of the last university was related to mistaking the concept of mentoring (publicised, as already mentioned, in connection with the competition for the best mentor) and tutoring, because US does not officially offer this type of class. However, in this as well as other Polish universities, types of classes which are reminiscent of tutoring are taught, i.e. dissertation seminars and discussion seminars. In these classes, the degree to which the so-called

4 The notion of a mentor is known to the students of the University of Szczecin, where the Student Union has been organizing a competition for the best mentor for the past 8 years.

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"tutoring spirit" is used depends on the competence of the academic. In addition, one can encounter a form of academic guidance offered by Vice Deans for Students/Didactics or coordinators for studies at other national universities (the MOST programme) and foreign universities (Erasmus is the best known in Europe), which consists of advising/establishing together with the students a set of modules in an individual study plan. However, it is necessary to emphasise the differences between these activities and a series of regular teacher-student meetings which are based on jointly agreed and negotiated academic and/or development goals and whose implementation is guaranteed by the tutoring practice, including its theoretical assumptions (Przybylska, 2015). Generally, however, tutoring is not widely known.

In the context of the above, in order to find out about the students' need for a less well-known form of classes, it was first necessary to check whether they correctly identify and distinguish between the competencies of a mentor and a tutor. Knowledge of these competencies indirectly helps in understanding the essence and specificity of tutoring. Therefore, the students were asked to indicate the competencies which, according to them, are characteristic of both functions/roles. Of the four given competencies, a maximum of two could be selected. Figure 1 presents opinions on tutor competencies. The largest number of respondents (49%) indicated that speaking, in the sense of transferring knowledge/teaching, is a tutor competence. This is because a tutor knows more than a student does and should inspire the student to acquire this knowledge. 44.5% were in favour of the "knows" competence, that is the tutor has knowledge not only about a given subject but also about the student. Slightly fewer, i.e. 42% indicated the competence "asks" - with the aim of activating the student, strengthening the student's self-knowledge and increasing the sense of responsibility for their own actions. The smallest percentage (18%) was observed for the competence "does not know", which is correct because the tutor, who is to play a significant role in stimulating the student to make an effort and develop, cannot lack knowledge about the subject matter or the tutee. However, the proportion of responses in the case of the first three competencies is only partially correct; according to the proposal described by Sarnat-Ciastko (2015), the most important competencies of the tutor are "knows" and "asks", which students have marked, but thought they were less important than "says" – in fact, it should be the other way round. Meanwhile, it is questioning and lack of knowledge that inspire more to search/inquire (because they stimulate curiosity, leading in effect to development), and not just speaking (in the sense of giving ready answers). The responses confirm that the students do not fully understand the essence of tutoring, although they make quite good inferences about this topic.

However, the students defined mentor competencies correctly. 79.5% of the respondents indicated the competence "knows", and 71% "speaks" (Figure 2), which is consistent with Sarnat-Ciastko's specifications. The role of a mentor is to transfer knowledge, instruct, advise and, to a small extent, question, which was indicated by 21.6% of the respondents. A mentor cannot lack knowledge, which was indicated by 2.4% of respondents. It is interesting to note, that a large number of students associated the term mentor not only with the competition organized at the University, but also with the film "Game of Thrones", in which a mentor is presented as an older

The results do not add up to 100% because the respondents could choose more than one answer.

Figure 1: Students' opinions on tutor competencies
person, experienced, with vast knowledge in various fields, performing the function of a teacher, counselor, and even a doctor. Therefore, it can be said that the students correctly related their knowledge about the film to the real competencies of a mentor.

The results do not add up to 100% because the respondents could choose more than one answer.

**Figure 2: Students' opinions on mentor competencies**

Next, the students were asked whether they would like to participate in individual classes with a tutor as part of university education. Most of the respondents (72%) answered the question positively. This suggests that these students need: (1) to develop themselves, their knowledge, passion, and skills; (2) a form of classes which is more personalised than group activities, focused on an individual approach, as also mentioned by Przybylska (2015). Indirectly, this signals that the students feel a little dissatisfied with regards to acquiring knowledge through the use of common forms of teaching, i.e. with regards to the quality of education. The remaining students (28%) did not show a willingness to learn using the tutoring method. On the one hand, this is normal because not everyone is proactive in the sense of Covey (2007) and Majewska-Opielka (2015) or wants to engage in extra-curricular activities. On the other hand, if students do not have willingness/ambition to self-develop, which is, after all, expected from future elites, then this indicates a reduced quality of education. In summary, the result indicates that the use of tutoring is advisable as a remedy for too low quality of education in higher education institutions, where gifted and ambitious students have become invisible.

To complement the knowledge about the students' willingness to participate in individual classes with the tutor, the students were asked what type of tutoring they would like to experience. 90% of the respondents said they would like developmental tutoring, and only 10% academic (Figure 3). Indeed, such an answer was anticipated because the studies at the Faculty of Economic Sciences and Management are typically undertaken by people who are motivated mostly by a pragmatic goal to get an education that will facilitate finding a job in the future. Therefore, they treat developmental tutoring as a way to acquire additional knowledge, skills, and competencies that will make them more competitive compared to others in the job market. On the other hand, academic tutoring was indicated by students (presumably, those more capable and more ambitious than others), who saw in it a means for self-development, which would enable them to get better grades for their own satisfaction, and who are considering an academic career.

In the context of the above, the students were asked to define their expectations about tutorials. In the multiple-choice question, there were 8 suggested answers and one open with the possibility of giving one's own suggestions. Students could choose a maximum of 3 responses (Figure 4). The most frequently chosen expectations about tutorials were as follows: "they will set the developmental path" (55%), "they will complement knowledge and competencies (implicitly, needed to find a job)" (52%) and "they will increase my value in the job market" (33%). These 3
expectations were directly related to the developmental tutoring preferred by the surveyed students. The answers given suggest that they are characterized by a high level of activity and willingness to develop in order to better prepare for the requirements of compete in the job market. Academic tutorials were also associated with the answer "they will motivate to work systematically", but this was chosen by the fewest respondents (21%), which means that this expectation was the least important for them. The remaining 4 expectations related to academic tutoring were less frequently selected (on average by every fourth person). The percentages were as follows: "they will enable a greater academic development than traditional studies do" (28%), "they will offer the option of personalized education" (26%), "they will create the opportunity to develop a student-master relationship" (24%), "they will provide the opportunity to discuss a given problem"(23%). These responses show that students want to develop using more individual-oriented approaches that will bring them better results than mass learning. It also demonstrates the students' awareness of the reduced quality of education in universities, given that they are open to new teaching methods. This is also evidenced by the answer to the question whether all students should use tutorials; 58% gave a
positive answer and 42% negative. It also demonstrates the students' awareness of the reduced quality of education in universities, given that they are open to new teaching methods. This is also evidenced by the answer to the question whether all students should use tutorials; 58% gave a positive answer and 42% negative.

CONCLUSIONS AND RECOMMENDATIONS

The analysis of the students' answers indicates that:
- tutoring is not widespread in Poland (until 2018, only six universities offered tutorials),
- most of the respondents did not know the concept of tutoring and tutor, they became familiar with them only during the research, but most of them knew the concept of a mentor,
- after a generic explanation of the term tutor, they were able to determine tutor competencies quite well, but they did not determine their significance accurately,
- the majority of respondents would like to participate in developmental tutoring because it better suits their expectations and prepares them to meet the requirements of the job market,
- the students are aware of the depreciation of the quality of education at universities and see an opportunity to improve it through tutoring.

Since even students are advocating the spread of tutoring in Polish universities, it is necessary to think about the way of permanently introducing it to the programme.

Changes aimed at, among others, improving the quality of education, which will occur in connection with the adoption of a new law on higher education by Sejm (the lower house of the Parliament of Poland), provide a good background for promoting tutoring in Poland. The Ministry of Science and Higher Education project "Masters of didactics", which aims to prepare a group of experienced academic teachers to work using the tutoring method through six months of practising at the best foreign universities, is a step in this direction. It is a formal signal commencing the promotion of tutoring, which is likely to become one of the obligatory methods of teaching in higher education institutions. Universities will have to include it in their study programmes and will, therefore, be required to give lecturers the opportunity to gain tutor qualifications, because very few have them. This constitutes a dramatic difference in relation to the past, where tutor training had a commercial purpose, depended on the goodwill of the lecturer willing to develop and the faculty dean, who covered the costs of such training, but usually did not create organisational environment for conducting tutoring, because university regulations did not allow that. Therefore, now is the best time to introduce changes/flexibility, both in university statutes and in their regulations, including in terms of introducing new methods and forms of education. In addition, to encourage lecturers to gain tutor qualifications and conduct tutorials, it is necessary to assign an adequate value to this qualification in professional development; thus far, the teaching skills have not been appreciated in this process, which discouraged lecturers from making an extra effort (Krajewska and Kowalczuk-Wałędziak, 2014).

Implementation of tutoring is all the more important as the financing conditions of universities will change. In order to be competitive and stay in the education market, universities will have to do more to seek new sources of financing their activities and ways of attracting students in the context of a demographic decline. One such method is for study programmes to offer the option of personalised education in the form of tutoring.

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5 Project participants should come from different universities and the training costs will be covered from public funds.
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Can Research Methods Ever be Interesting? Perspective of undergraduate Students of Faculty of Engineering Accra Technical University

1Bernard ARTHUR-AIDOO  
Department of Building Technology, Accra Technical University, Accra, Ghana  
bernardmartins@hotmail.com

2Eric SIMPEH  
Department of Construction Management and Quantity Surveying, Cape Peninsula University of Technology, Cape Town, South Africa  
simpehe@cput.ac.za

3Clinton AIGBAVBOA  
Department of Construction Management and Quantity Surveying, University of Johannesburg, Johannesburg, South Africa  
caigbavboa@uj.ac.za

4Patrick YEBOAH  
Department of Building Technology, Accra Technical University, Accra, Ghana

ABSTRACT

The need to improve students’ learning methods and interest in research methods as a subject via an activity based approach rather than the usual theoretical technique within the faculty of engineering at Accra Technical University is vital. Because the way the subject could inform other areas of students’ career path was not always apparent. Therefore, the aim of this paper is to assess the challenges faced by students in learning research methods and to provide alternative solutions to make the module interesting. The study is exploratory in nature, and extensive literature with regard to the study has been carried out supported by a semi-structured interview. Four (4) departments within the faculty of engineering of Accra Technical University were considered and ten (10) final year students from each department were randomly selected for the study. The study revealed that techniques applied in teaching the research methods subject in the faculty of engineering of Accra Technical University do not fully engage student interest. This has caused students to perceive research to be just an ordinary assignment and a mere formality that needs to be done and submitted. Further, it was established that students tend to be more interested in courses in line with their career rather than research methods. The perceptions of only undergraduate students within the faculty of engineering were analysed, and as a result, the reported findings cannot be generalised. However, the findings reported are akin to what the normative literature has reported. Therefore, this paper provides the basis for vivid research to be undertaken and future developments will include collecting more empirical data to support redesigning the content of the research methodology module. The study suggests that a more extensive and simple way of teaching research methods would have to be established to improve on the interest of students for the module.

Keywords: Engineering, Learning, Research Methods, Teaching, Technical University, Undergraduate students
INTRODUCTION

Final year Higher National Diploma (HND) students in the faculty of engineering (Building, Mechanical, Civil and Furniture Department) at Accra Technical University embark on a research project work, which is a requirement of their level three (3) studies. The content of the designed HND syllabus for research methodology is to enable students to develop research skills and be able to write a technical report (NABTEX, 2000). The research methods modules taught at the second year of the HND programme is to equip the students with the needed knowledge and understanding of the subject to enable them to design and carry out suitable research during their final project work. The subject focused on theoretical methods and was taught once a week without any seminar or workshop. According to Bathmaker (2013), the vocational focus of colleges and polytechnics means that preparation is taking place in an atmosphere where scholarship and research are not an integral focus of the institution. For undergraduate students, regardless of the context in which they study, gaining a solid foundation in research methods is essential in preparing them initially to complete the final year dissertation, and more importantly, meeting the demands of many employers who value the research knowledge graduates possess (MacInnes, 2012).

However, the subject research methods have usually been seen by students as a conceptual subject and have been taught as such: focusing upon theory rather than practice, which led to the subject being seen as applicable across courses. The way the subject could inform other areas of students’ career path was not always evident. Students did not appear to appreciate that the research methods and proposal writing they were introduced in the second year of their studies were significant to their final year project work. Both the research methods and the proposal writing were seen as a mere subject which has to be passed as a requirement to obtain the HND certification. This does not establish students’ interest in the subject as a result of the difficulty connecting what students learn in these classes to what they learn in other modules. It has been reported by Kelly (1992) and Thompson (1994) that students have learning difficulties with research methods modules, including difficulty linking the abstract nature of research methods modules to other modules or real life situations. Different approaches have been recommended to improve students experience on research methods modules. However, the literature relating to the teaching of research methods is fragmented (Carty, 2007). With this in mind, this paper aims to assess the challenges faced by students in learning research methods and to provide alternative directions to make the module interesting. Specific objectives include; to determine prudent ways to encourage students’ interest regarding research methods, to ascertain why students do not have a keen interest in research methods and to establish whether research methods could ever be interesting. Pertinent literature related to challenges that make research methods subject uninterested has been reviewed. The methodology used to achieve the aim and objectives of the paper has been presented. The challenges that students grapple with regarding the teaching of research methods modules are outlined and conclusions are formulated based on the findings.

REVIEW OF LITERATURE

This section of the paper seeks to appraise the salient points of the literature review with a view of discovering the challenges that make research methods subject uninterested. Research primarily does not include the routine activities of applying what is already known. It is designed for activities meant to discover facts and relationships that will make knowledge more effective (Artino, 2012). Educational research can be defined as a systematic and scholarly application of the scientific method, interpreted in its broadest sense, to solve educational problems. It relates to the systematic studies designed to provide education with a more effective means of attaining a worthwhile educational goal (Artino, 2012). Previous studies (see Kelly, 1992; Thompson, 1994; Benson and Blackman, 2003; Carty, 2007) suggested that students across all levels in Higher Education (HE) have learning difficulties with regard to research methods modules. This is substantiated by Wagner et al. (2011) who stated that engaging undergraduate students (National Diploma (ND), Higher
Various researchers have identified some of the most difficult challenges for students taking research methods classes. Empirical evidence demonstrates that in many cases the research methods curriculum was limited, with students only been exposed to a narrow range of modules that may come under the banner of research methods. Concentration on what may be professed as the more palatable aspects of this subject including literature searching and qualitative research methods with reporting research, quantitative research methods and research paradigms receiving least attention (Gray, Sutton, Turner & Swain, 2015). Gray et al. (2015) further argued that limited coverage suggests that students are only developing a partial understanding of the research process and may lack contextual knowledge on which to defend their research. Other challenges include difficulty connecting what students learn in these classes to what they learn in other modules or to real life situations (Winn, 1995; Chapdelaine & Chapman, 1999; Dunn, 2000; Eamon, 2001; Lipsitz, 2000) or the requirements of the dissertation (Benson & Blackman 2003). More so, research examining the provision and pedagogy of research methods teaching is limited (Wagner et al., 2011), and mainly centred on HE delivered within the traditional university-based setting, little is known as to how this subject is addressed outside of universities including polytechnics and colleges.

Some different approaches have been recommended to lessen these difficulties and to augment the student understanding and experience concerning research methods modules (Carty, 2007). However, the literature relating to the teaching of research methods is fragmented (Carty, 2007). This fragmentation possibly contributes to the conclusion that, ‘there is little agreement as to the appropriate way to teach research methods or indeed its role and place in the curriculum’ (Booth and Harrington 2003: 24). For instance, Benson & Blackman (2003) contended that the conventional model of delivering research methods lectures has been the lecture model—grounded in theory, rather than practice—that usually falls short of providing an engaging learning experience for students. But, Carty (2007) suggested a pragmatic approach to teaching research methods, however, this approach will also be of less interest particularly to students who wish to pursue a higher degree or to undertake professional research. Carty (2007) explains further that different disciplines are often associated with specific research methods, for instance in scientific research a working knowledge of quantitative techniques is necessary. However, the findings of earlier researchers concerning linking research methods teaching to real life situations, activity based, student-centred learning and clarity about learning outcomes should be of value to research methods lecturers in most situations. Lewthwaite & Nind (2016) were also of the view that knowledge and understanding of research methods can be enhanced through pedagogic culture and practice. Hence, pedagogic looks in the process of making research visible are about active engagement rather than just activity (Lewthwaite & Nind, 2016). According to Keyser (2000), to hook in – or connect – learners and research methods might require active learning, ‘which gets students actively involved’ (Keyser, 2000: 35) in solving problems and using methods. Kilburn et al. (2014: 197) referred to a group of teaching methods linked by the goal of making the ‘research process visible by actively engaging students in the aspects of the methods at hand’. Teachers working in a student-centred way to foster engagement might use tasks and exercises, but also examples, metaphors or vignettes to make the research method knowable to learners (Kilburn et al., 2014).

THEORY OF TEACHING AND LEARNING

Learning theories are conceptual frameworks describing how knowledge is absorbed, processed, and retained during learning. Ertmer and Newby (1993) postulates that although there are many different approaches to learning, all are centered on the three basic types of learning theory: behaviorist, cognitive constructivist, and social constructivist as depicted in Table 1.

Table 1: Learning of theories
Understanding of knowledge

<table>
<thead>
<tr>
<th>Behaviorism</th>
<th>Cognitive Constructivism</th>
<th>Social Constructivism</th>
</tr>
</thead>
<tbody>
<tr>
<td>Knowledge is a repertoire of behavioral responses to environmental stimuli.</td>
<td>Knowledge systems of cognitive structures are actively constructed by learners based on pre-existing cognitive structures.</td>
<td>Knowledge is constructed within social contexts through interactions with a knowledge community.</td>
</tr>
</tbody>
</table>

Understanding of learning

<table>
<thead>
<tr>
<th>Behaviorism</th>
<th>Cognitive Constructivism</th>
<th>Social Constructivism</th>
</tr>
</thead>
<tbody>
<tr>
<td>Passive absorption of a predefined body of knowledge by the learner. Promoted by repetition and positive reinforcement.</td>
<td>Active assimilation and accommodation of new information to existing cognitive structures. Discovery by learners is emphasized.</td>
<td>Integration of students into a knowledge community. Collaborative assimilation and accommodation of new information.</td>
</tr>
</tbody>
</table>

Understanding of motivation

<table>
<thead>
<tr>
<th>Behaviorism</th>
<th>Cognitive Constructivism</th>
<th>Social Constructivism</th>
</tr>
</thead>
<tbody>
<tr>
<td>Extrinsic, involving positive and negative reinforcement.</td>
<td>Intrinsic; learners set their own goals and motivate themselves to learn.</td>
<td>Intrinsic and extrinsic. Learning goals and motives are determined both by learners and extrinsic rewards provided by the knowledge community.</td>
</tr>
</tbody>
</table>

Implications for Teaching

<table>
<thead>
<tr>
<th>Behaviorism</th>
<th>Cognitive Constructivism</th>
<th>Social Constructivism</th>
</tr>
</thead>
<tbody>
<tr>
<td>Correct behavioral responses are transmitted by the teacher and absorbed by the students.</td>
<td>The teacher facilitates learning by providing an environment that promotes discovery and assimilation/accommodation.</td>
<td>Collaborative learning is facilitated and guided by the teacher. Group work is encouraged.</td>
</tr>
</tbody>
</table>

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Behaviorist teaching methods tend to rely on so-called exercises to provide the consistent repetition necessary for effective reinforcement of response patterns and is also called the “skill and drill” methods (Skinner, 1976). Other methods include question (stimulus) and answer (response) frameworks in which questions are of gradually increasing difficulty; guided practice; and regular reviews of material. Behaviorist methods also typically rely heavily on the use of positive reinforcements such as verbal praise, good grades, and prizes (Skinner, 1976).

Similarly, Cognitivist teaching methods aim to assist students in assimilating new information to existing knowledge, as well as enabling them to make the appropriate modifications to their existing intellectual framework to accommodate that information (Perry, 1999). Further, the method provides students with sets of questions to structure their reading makes it easier for them to relate it to previous material by highlighting certain parts and to accommodate the new material by providing a clear organisational structure (Perry, 1999).
According to Vygotsky (1978), social constructivism is a variation of cognitive constructivism that emphasises the collaborative nature of much learning. Social constructivism was developed by post-revolutionary. Vygotsky (1978) further opined that all cognitive functions originate from and are explained as products of social interactions and that learning did not simply comprise the assimilation and accommodation of new knowledge by learners; it was the process by which learners were integrated into a knowledge community. Vygotsky (1978) stressed that language and culture play essential roles both in human intellectual development and in how humans perceive the world. Humans’ linguistic abilities enable them to overcome the natural limitations of their perceptual field by imposing culturally defined sense and meaning on the world. Language and culture are the frameworks through which humans experience, communicate, and understand reality (Vygotsky, 1978).

In view of the theories captured in this study it can be deduced that learning becomes easier when there is clear knowledge and understanding. This further suggests that dissemination of information needs to be driven by these ingredients to ensure clear transfer of knowledge.

RESEARCH METHODOLOGY

The research was carried out in two stages. The first stage was a comprehensive literature review. The literature review provided the theoretical basis for the paper and also the basis for the second stage - the interviews. Interviews are most effective in research where in-depth is required into an understanding of natural phenomena (Naoum, 2004). The research interview is characterised by a methodological awareness of question forms, a focus on the dynamics of interaction between interviewer and interviewee, and also a critical attention to what is been studied. The interviews carried out were semi-structured. Semi-structured interviews were chosen because it did not only provide the best flexibility but also it positioned the issues in context. Fellows and Liu (2008) contended that semi-structured interviews fill the spectrum between structured and unstructured interviews. They may vary in a form quite widely, from a questionnaire-type interview with some probing to a list of topic areas in which the respondents' answers are recorded.

In embarking on the interviews, four (4) departments from the faculty of engineering at Accra Technical University were considered. These departments include Building Technology, Civil Engineering, Mechanical Engineering, and Furniture and Design. In order to have a prudent representativeness of students, ten (10) final year (3rd year) students from each department were selected at random to participate in the study. Third year students were chosen because they have already studied research methods in the second year to prepare them to embark on their final year main project work at the final year level. A semi-structured interview was designed to collect data relating to the expression of research methods with project work, students’ perception concerning research methodology as a subject and the source of information for their final dissertation. Other information included the quality of study materials for research methods and learning presumed to be in place. Each interview was tape-recorded and subsequently transcribed. A framework for making comparisons and contrasts between the different respondents was created by looking for trends which are present in the whole set of the interview. An analysis of the data was carried out, and emerging themes were identified.
PRESENTATION AND DISCUSSION OF FINDINGS
Mechanical Engineering and Furniture & Design students
Interviewees (students) from mechanical and furniture & design departments stressed that research methods subject had given them an in-depth understanding into what they are researching on because they are applying the theoretical knowledge acquired in research methods during their second year of study. An example of such statement is “My topic is related to my course because I have been taught about machines and repairs”. “My research topic relates to cutting machines and as such am applying the concepts of the taught research methods to do my project work.”

Students’ insight regarding research methods
Interviewees stated clearly that they do not have any framework for their research, implying students’ lack an in-depth understanding of what research methods are all about. One of the students mentioned that he understands the concept of research methodology. On the other hand, the other student argued that he understood the concept of research methodology partially due to the limited time (credit hours) allotted for research methods in the second year of study. The respondent, however, suggested that it will be prudent to offer research methods from the first year through to the third year to enable students to grasp the concept and get a comprehensively understanding of the subject. The student cited an example by saying “Because the time is limited, can the subject be taken (taught) in the first year so that you will have more time to study it well.”

Source of information
One of the students stated that the source of information for his project work is via observation in the workshop, the internet and interaction with fellow students. A according to the other student, his source of information is via personal experience since the automobile industry is a practical field. However, he lamented that he is not getting relevant information related to his topic from textbooks since the library on campus is ill-equipped.

Lecture materials and notes
One of the interviewees affirmed that most of the lecture materials/ notes given to them at the end of each class are not in line with new trends in research methods and technologies given that most of the information is out dated as compare with information on the internet. Besides, some of the information is irrelevant to the area they are researching on, implying that specific learning outcomes are not achieved at the end of the academic year. On the contrary, the other interviewee stated that the lecture materials are in line with the new trend of research.

Learning presumed to be in place
According to the students’, research method is a mandatory pass for the final year mini dissertation. Therefore no students will be allowed to carry on his/her project work if you did not pass research methods at the second year level. However, one of them opined that students should be allowed to undertake their research dissertation if they are unable to pass and be given the opportunity to do that subject after successful completion of the dissertation. As a result of this practice, students tend to use ways and means to pass this subject at all course to gain entry into the third year. With regard to which level research methods should be taught, interviewees were emphatic that the subject should be taught at second year level to enable students to apply the theoretical knowledge acquired in research methodology during the third year. Respondents also lamented that research method is a broad subject which should not be taught only at the second year since the time allocated for the subject is very limited. One of the students’ was quoted as saying “When dealing with a broad subject like research methods, I think a semester alone would not be the best time allocated for that particular course. When talking about project work it is not all about research work; one has to do production work and other modules. Normally the perception students have
about the project is research work, so if we are taught for two semesters we will know more about research work”.

Findings: Building Technology and Civil Engineering Students

Interviewees from building and civil engineering departments stated that research methods gave them an in-depth understanding into what they are researching about because they are applying the theoretical knowledge acquired in research methodology during their second year of study.

Students’ insight regarding research methodology

Interviewees stated clearly that they do have a framework for their research methodology. The concept of research methodology was quite a challenge to one of the students; on the other hand, the other respondent did understand the concept of research methods.

Source and quality of information

One of the respondents stated that the sole source of information for his dissertation is via the internet. The other interviewee maintained that though he is using the internet, however, it has not been easy getting information, because the institution does not subscribe to journals and conference papers related to his field of study.

Quality of Lecture materials and notes

One of the respondents stated that the lecture materials/notes are in line with new research methods, on the other hand, the other student lamented that the lecture notes provided them are not adequate to give them an in-depth understanding of what and how research can be carried out. For instance, that student was quoted as saying; “In fact, as I speak right now, the lecture notes that I have as compared to what am embarking on is not adequate at all.”

Learning presumed to be in place

According to the students, research method is a mandatory pass for the final year project work. With regards to which level of their study must research methods be taught, the interviewees were emphatic that the subject should be taught from the first year through to the third year so that students can get the understanding that they need. The respondents suggested that research methods should not be credit bearing, but, something that would provide us the basic knowledge with regard to how to conduct a treatise.

CONCLUSIONS

The following conclusions as they relate to the research can be drawn:

(1) Differences exist in how research methods subjects are taught without any core linkage to students’ programme of study, thereby making the subject uninterested.

(2) Theoretical concepts by which the subject is taught does not make it so interesting to students learning the subject.

(3) A single semester alone with its limited credit hours for teaching research methods subject was not enough for students to be able to understand fully and apply the concepts of the subject needed for their project work.

(4) The research methods subject was not taught at all the levels, but, only in the second year of students’ study to be applied for the third year project work.

(5) There was an apparent lack of student engagement with their learning process that was affecting both the research methods subject itself and also their zeal to undertake independent research in the final year. Admittedly, it would be prudent to stress that since research module forms the
fundamentals of the student’s individual research, all efforts by project supervisors and lecturers must be established to make the module attractive to enhance students’ interest.

RECOMMENDATIONS
Based on the aforementioned findings, there should be uniformity with regard to how research methods module is taught. The study also recommends that a more extensive and simple way of teaching research methods would have to be established to improve on the interest of students for the module. The subject must not only be theoretical, rather there must be students’ involvement, such as assigning mini projects to the student so as to make it practical oriented at the early stages of design.

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Development of Workshops for Didactics in Higher Education

Dipl.-Päd. Anke LUBKOWITZ
Genio Team, Recklinghausen, Germany
anke.lubkowitz@genio-team.de

Prof. Dr. rer. pol. Kay PFAFFENBERGER
Flensburg University of Applied Sciences, Flensburg, Germany
kay.pfaffenberger@hs-flensburg.de

Prof. Dr.-Ing. Christian WILLEMS, M.A.
Genio Team, Recklinghausen Germany
Christian.Willems@w-hs.de

Dipl. Volkswirt Martin KÜHN
Flensburg University of Applied Sciences, Flensburg, Germany
martin.kuehn@hs-flensburg.de

ABSTRACT
As part of the PEESA II project, two one-week workshops were designed, planned and carried out, taking into account intercultural and interdisciplinary aspects for teachers from the African partner universities in South Africa and Namibia, based on the experience of networks for didactics in higher education of the universities of applied sciences in Germany. The basic approach of the didactic workshops was the development of a common understanding of teaching and learning (coupled learning) for the transfer to one's own teaching and to the higher education environment in Africa and Germany.

Keywords: Higher education didactics, international approach(es) on higher education training, workshop, teaching and learning

INTRODUCTION
At the end of the PEESA project, there were still some outstanding issues. It became clear that developing a common understanding of learning and teaching is crucial to ensure lasting and sustainable cooperation with a strong common ground. All participants considered it necessary to continue close cooperation in order to remedy the lack of this strong common ground. That's how the PEESA II project was born. The planned foundation of a German-East African university was at that time an additional driving force of this effort. The aim of the PEESA II project was to create a basis for further German-African projects, especially in the areas of renewable energies and in the field of modern teaching and learning. This aim as well as the project's focus on the intercultural and interdisciplinary exchange of students and lecturers from Southern Africa led to the idea of...
implementing workshops. The findings developed in this project for the development and implementation of curricula, didactic findings, experiences from the exchange, etc. should be freely accessible to third parties.

**STARTING SITUATION, OBJECTIVE, PROJECT PLANNING**

One focus of the PEESA II project was the exchange of African and German teachers within the framework of workshops for didactics in higher education. The objective was the intercultural and interdisciplinary exchange between African and German teachers. All participants should become aware of their individual, biography-related teaching competence. It was necessary to further develop, professionalize and develop a basis for a common understanding of teaching and learning. Since there was no experience with African teachers in the field of didactics in higher education in the run-up to the project, the academic and didactic challenge consisted of the offers institutionalized in Germany, as offered by leading networks for didactics in higher education at universities of applied sciences, and to transfer and adapt to sharing and collaborating with African university lecturers. After the workshops, the results were reflected. The focus was on possible future fields of action and the founding of an East African-German University of Applied Sciences in Kenya.

**RESULTS OF THE WORKSHOPS**

The exchange in the workshops showed the similarities and differences regarding the university structures (transparency, system comparisons), the accreditation models (state vs. private agencies) with implications for the course of studies. Decisive aspects are the personal academic careers (biographical development), access, selection and development of teachers (professional practice, scientific activity, didactic development, culture of teaching and learning), the development of teaching competence and the teaching load with contact and self-learning phases.

Diversity and heterogeneity of the student body, regional and social differences (catchment areas), competencies (depending on the learning environment of which the student body is composed), language barriers experienced (official / university languages vs. tribal languages) show that the discussed competences for study ability must be increasingly defined to the specifics of the degree program and to develop further measures (e.g. introduction of a pre-semester, propaedeutics, development of specific university/campus cultures, Formula Student etc.).

The experienced methods and tools in these workshops were helpful for the own everyday teaching (competence model, use of qualification frameworks, learning rooms as planning tool for courses also in an international context, course development with taxonomy matrix, "constructive alignment" etc.) as well as for other fields of application (accreditation, curriculum development, definitions of transitions, mobility of students/teachers), see Fig. 1 to 3.
Development of Competencies – Learning Loop

2, 70% of knowledge: non-formal, informal, autonomous, self-organized learning processes

Shift from teaching to learning

≤ 30% of knowledge directed scholar processes

Encouraging demanding recognition critics...

Learning

-action

Experience

Reflection

(Constructive) thinking

Personal

Talent

Competence

Not visible

curiosity

needs

inner drivers

sense

motivation

emotion...

Performance

Visible

To know

To be able to do

To be willing to do

courage to do

Action

No action

Conflicts +/-

Allowed

Must

Yes

No

No

To deny

Figure 1: House of Learning Theories, ref. Staatsinstitut für Schulqualität und Bildungsforschung München (ISB), URL: http://www.foerdern-individuell.de/index.php?Seite=6817&PHPSESSID=0567dd0c61dd83b336b2b28b63aad52e

Figure 2: Development of Competencies – Learning Loop, Willems et al, own representation

Development of Workshops for Didactics in Higher Education
Dipl.-Päd. Anke LUBKOWITZ, Prof. Dr. rer. pol. Kay PFAFFENBERGER, Prof. Dr.-Ing. Christian WILLEMS, M.A., Dipl. Volkswirt Martin KÜHN
Fig. 3: Development of the course "Project Design" with the method Lern-Z.I.M.M.E.R, ref. Workshop, Flensburg 08/2017

POTENTIAL FUTURE FIELDS OF ACTIVITY

It is recognized that workshops for didactics in higher education or similar offers of this kind are suitable for creating/developing a common understanding of teaching and learning. It needs to be clarified how these insights can be incorporated into everyday teaching, quality management of teaching, course development and didactics in higher education of the participating universities and their programs (transfer both to the participants' own teaching and to the higher education environment, e.g. through institutionalization of train-the-trainer programs at participating universities).

Once it has been clarified which diffusion and publication paths are needed to communicate the results and findings from these workshops to the respective proactive action and decision levels, the development of a generalized "blueprint" is possible. Important cornerstones for this are according to current knowledge:
• Concentration on a country-specific configuration of didactics in higher education offers regarding to national legislation, qualification frameworks and coordinated needs

• Development of didactic offers incl. investigation of programs for didactics in higher education of participating universities and universities of applied sciences (also in comparison with developments in Germany) on the basis of existing university/campus cultures

• Participant orientation by definition of the target groups (homogeneous or heterogeneous composed, e.g. persons responsible for the program development, deans, peers, teachers with or without experience in didactics in higher education, etc.), analyzes of the target groups (participants), exchange of teachers and learners about questions to didactics in higher education

• Diversity and heterogeneity of entry cohorts, development of study-specific study ability, comparison and development of different study entry models for support, student support in higher semesters

• Development and use of macro- and microdidactic models, tools and methods (for example competence models, qualification frameworks, learning Z.I.M.M.E.R., taxonomy matrix, constructive alignment etc.) in the design of degree courses, courses and didactic training courses

SUMMARY AND OUTLOOK
For the possible future development and professionalization of teaching at African universities, a first concept is derived based on these workshops. This includes the insights and needs in line with the requirements for qualification frameworks and framework conditions for curricular program development applicable or developing in the partner countries.

The accompanying didactic development should, especially in connection with the concepts developed or to be developed, achieve a mutual understanding of the provision of competence-oriented teaching, learning and examination systems. The concept of these workshops can be used specifically for projects in the sense of a blueprint for future didactics in higher education and training in Africa.

Feasibility studies make it possible to adapt to the current requirements and an agile concept. The results and findings thus also support the planned establishment of an East African German university in Kenya.

The results of the workshops set new impulses for the design and quality of study programs, also for didacties in higher education in Germany.
Introduction Barriers of Lean Implementation in Polish Manufacturing Sector

Marzena FRANKOWSKA
Faculty of Management and Economics of Services, University of Szczecin, Poland
marzena.frankowska@wzieu.pl

Justyna MYSZAK
Faculty of Management and Economics of Services, University of Szczecin, Poland
justyna.myszak@wzieu.pl

Barbara CZERNIACHOWICZ
Faculty of Economics and Management, University of Szczecin, Poland
barbara.czerniachowicz@usz.edu.pl

ABSTRACT
Lean manufacturing (LM) is the approach which encompasses a set of highly efficient manufacturing techniques developed in the 1980s and early 1990s. Lean manufacturing has been increasingly recognised and used as a business strategy by many companies around the world to achieve a competitive advantage. However, many authors agree that LM firstly was implemented with success by large companies, so today’s knowledge about lean implementation is based on their characteristics, success and failure factors and best practices. According to Womack et al. (1990), lean manufacturing is applicable to all companies despite their size or types. However, based on analysis of literature, in existing studies there has been identified a gap in research and knowledge in the form of limited consideration for the time factor in perception of implementation barriers. There has been assumed that the understanding of reasons which hamper companies from the improvement of processes in the organization is of particular importance in terms of them seeking competitiveness. Thus the purpose of this paper is the identification of barriers which prevent implementation of lean instruments by manufacturing companies in Poland. Based on the surveys conducted in Polish manufacturing companies there has been undertaken the effort to determine internal and external barriers as well as investigated the domain knowledge of companies which had not implemented LM, including awareness of the expected benefits from lean management implementation.

Keywords: lean manufacturing, lean implementation, lean management, manufacturing industry

INTRODUCTION
Today lean manufacturing (LM) is considered one of the main concepts which allows for the competitiveness boost for manufacturing companies. The main benefits of implementing LM, are inter alia: cost reduction of processes, maximizing production efficiency, stock level reduction, or product quality improvement. These benefits can be called 'hard' factors, as they are directly related to production. But it is worth mentioning the so-called "soft factors", which in turn are linked to the increase in employee motivation, leadership, development of organizational culture, or improving communication among employees of different levels. More and more frequently can be found claims that the implementation of the LM is an essential component towards the next stage of industrial evolution - that is so-called Industry 4.0.
Meanwhile, despite the fact that more and more companies in Poland decide in favour of implementation of the LM instruments, the result is still unsatisfactory. Both predominantly foreign capital and domestic capital businesses are referred to here. In addition it often proves that the implemented instruments are unstable, which effectively discourages organizations from further actions towards the implementation of the lean management. This is a worrying phenomenon as it may limit the competitive capacity of Polish companies in the future, especially that the manufacturing sector has been playing a critical role in developing and advancing the world (Moradlou, Perera 2017). Moreover, after significant escalation in offshoring strategies implemented every year, results from surveys showed lower success rates than what was expected initially. As a result in recent years, there has been a decline in offshoring and many developed countries decided to re-shore parts of their manufacturing sectors from low cost countries (Moradlou, Backhouse, Ranganathan 2017; Moradlou, Perera 2017).

Therefore, understanding the causes behind hampering companies from the improvement of organizational processes seems to be of particular importance. However, prior detailed analysis of literature (Frankowska, Myszak, Sowa 2017) allows to note that to date the research has been focused primarily on barriers encountered in the implementation of the LM in enterprises. This shows the vulnerability both in terms of cognitive aspect and research itself. Thus, the main objective of this article is to identify the barriers hampering organizations before the implementation of LM tools. In turn, the research problems have been formulated in the form of the following questions:

- What internal barriers block the companies from implementation of the LM?
- What are the external barriers to the implementation of the LM?
- What is the domain knowledge of companies not implementing the LM, including awareness of the expected benefits?

For the realisation of the scientific objective there was carried out a CATI survey among Polish companies (Zachodniopomorskie voivodship), which allowed for collection of responses to the identified research problems.

**LITERATURE REVIEW**

The subjects literature is relatively rich in guidelines which describe, for example: a framework for lean manufacturing implementation, X-steps implementation plan or how to implement lean management, where to pay special attention and what should be avoided. There are also easily available studies which show a number of benefits as well as barriers with which companies have dealt during the implementation of the lean instruments in different countries. What is interesting, there are also available comparative analyses. During the review of literature in terms of implementation barriers regarding lean management, however, there has been noted that authors treat these obstacles quite broadly. This means that when describing the deployment obstacle they quite frequently ignore the identification of barriers within the implementation phase i.e. introduction barriers or implementation barriers. It seems that taking into account the actual point at which the company is to take or reject the decision on the implementation of the lean instruments may have a significant impact on the perception of the barriers. As seen from the observations and preliminary interviews with senior management, there is a considerable number of companies which fear the implementation of lean for a variety of reasons. Looking at the current researches in academic literature some barriers of lean implementation are often repeated. R. Kumar and V. Kumar (2014), for example identified seven major barriers (which include numerous detailed factors) of lean manufacturing implementation in Indian industry (table 1).

<table>
<thead>
<tr>
<th>Main barriers</th>
<th>Detailed barriers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Management</td>
<td>lack of management focus, lack of urge to create the sense of urgency, lack of...</td>
</tr>
</tbody>
</table>

**Table 1: Barriers in Lean Manufacturing Implementation**

Source: own processing based on Kumar R., & Kumar V. (2014)
Introduction Barriers of Lean Implementation in Polish Manufacturing Sector. Marzena Frankowska, Justyna Myszak, Barbara Czerniachowicz

<table>
<thead>
<tr>
<th>Resources</th>
<th>lack of labour resources, lack of capital fund, lack of communication, lack of idea innovation, mediocre consultants, lack of time</th>
</tr>
</thead>
<tbody>
<tr>
<td>Knowledge</td>
<td>lack of training, lack of understanding lean, lack of implementation know-how,</td>
</tr>
<tr>
<td>Conflicts</td>
<td>conflicts with other initiatives, disparate manufacturing environments, demand volatility, company culture, conflicts with ERP implementations</td>
</tr>
<tr>
<td>Employee</td>
<td>employees' resistance to change, middle management resistance</td>
</tr>
<tr>
<td>Financial</td>
<td>no direct financial advantage, financial benefits not recognised, no financial targets</td>
</tr>
<tr>
<td>Past experience</td>
<td>past experience of failure, lack of staying power</td>
</tr>
</tbody>
</table>

J. Jadhav, S. Mantha, S.B. Rane (2015) based on a review of literature these barriers are also extended by poor facility planning and layout. One of the pillars of Toyota System Production is Just in Time, which is related to frequent production with a small lot size. Therefore it means that the usage of "efficient, effective and reliable machines/equipment along with flexible factory layout is essential to meet demand variations". Lack of information sharing or communication with stakeholders (in real time) is another critical aspect identified by the authors. Lean manufacturing (and therefore - "pull" type) may be effected only via fruitful supplier-customer collaboration, which as a result is to adjust the production schedule to match the buyer's demand. In turn K. Salonitisa and Ch. Tsinopoulos (2016), besides the barriers listed, highlighted the entity which implements LM in the company. The authors stress that in Greek enterprises the employment of an external expert is not a common practice. Furthermore, they stress that the implementation of lean may not be based on the knowledge of one person, as "a critical mass of knowledgeable personnel is required for most the knowledge to the whole company. Moreover, it is important that the experts are company employees, because the rest of the personnel feels comfortable with them and they know and understand the culture of the company". Certainly, the lists of barriers presented is by no means exhaustive and may successfully be supplemented with additional items. However, they should indisputably be also considered before the implementation of lean manufacturing in order to avoid similar problems in the future.

In reference to the time factor, that is to linking the actual moment of the company’s history with the maturity of LM implementation, there is a very modest body of research regarding this aspect. An example of research which takes into account the time criterion in perceptions of LM implementation tools barriers is that by K. Salonitis and Ch. Tsinopoulos (2016). The authors have analysed enterprises with regards to the lean implementation maturity and indicated organizations which have implemented lean management: for less than a year, between 1 and 3 years and for more than three years. Their research shows that initially “the key barrier is workforce understanding and commitment to lean, and as they progress, the key problems become more related to the top management commitment and the availability of resources” (Salonitis, Tsinopoulos 2016). Based on the literature review, the most comprehensive and corresponding to the topic in question proves to be the research carried out by P. Mirzaei (2011) in SMEs in Sweden. In view of the above, Figure 1 presents the barriers highlighted by the author with respect to their variability in time and the division of the introduction and implementation barriers.
Introduction Barriers and Implementation Barriers - SMEs in Sweden

Source: own processing based on Mirzaei P. (2011)

The introduction barriers presented in Figure 1 are based on the author’s opinion as well as previous studies and experience. Concerning obstacles which hinder SMEs from applying lean manufacturing, the first four (1-4) barriers were reported by most of the respondents as the introduction barriers. Another three (5-7) barriers are also mentioned by a few respondents, but most interestingly, none of the respondents believes that lean manufacturing does not suit their organization and also none of them considers lack of management support as a barrier for changing to lean (Mirzaei 2011). Combining the results obtained from the study carried out by K. Salonitis and Ch. Tsinopoulos (2016) the fact that irrespective of the country or the size of the enterprise in the initial stage of the implementation of lean management (before the implementation) the management shows high desire to make changes seem appealing. However, with time, their involvement and support decreases, which is extremely surprising for management reasons. What is more, the list of pre-implementation barriers which effectively hamper the implementation of lean management is still not recognized and literature in this respect is scarce, therefore further in-depth exploration of this area is recommended.

RESEARCH METHODOLOGY

On the basis of previously developed, integrated array of lean implementation conditions (Frankowska, Myszak, Sowa 2017) there have been identified internal (endogenous - directly
associated with the company, including financial factors, human resources or production system) and external (exogenous - relating to the environment in which the company operates e.g. requirements of customers or expert support) conditions. As a result this has helped to identify the research problems. There was conducted a detailed review of the literature (theoretical and empirical) for LM pre-implementation barriers. Then the survey methodology was determined, as a result of which there had been developed a survey questionnaire dedicated to businesses which have not used any LM instruments. In parallel there has been created a database of 250 manufacturing companies located in the territory of West Pomeranian Voivodship.

The research involved telephone interviews, as a result of which the information was collected from 40 manufacturing companies, among which 20 complied with the pre-set criteria, i.e. had not undertaken earlier activities towards implementation of the LM. The entities surveyed were mainly small (8) and medium companies (5), micro-enterprises (4) and large companies (3). In most cases they are of domestic capital (15), but also foreign capital (2) and three entities are public enterprises. Only one company had operated on the market for less than 5 years, the remaining eight entities had operated for 6-10 years, four entities for 11-20 years and seven companies had had a record of functioning for more than 25 years. The respondents in the survey were primarily representatives of senior management (8) and middle management (8), as well as four specialists on quality assurance in the companies surveyed.
The research material was submitted for analysis on the basis of which there were drawn conclusions and proposed preliminary recommendations. Unfortunately, the research sample obtained is not representative and therefore the results of the research are of probing character and require confirmation in further research.

RESULTS AND DISCUSSION (FINDINGS)
The companies might choose not to implement LM because of barriers, divided into internal and external types. The respondents were asked to assess them in order to determine the importance of a variety of factors. Firstly, the respondents assessed the importance of internal barriers (Figure 3). The average assessment shows the average impact of this category of barriers on the implementation LM tools in the enterprises surveyed. It seems that the financial factors are the most prominent internal barrier (3,4/5,0) along with the lack of adequate resources, such as an appropriate number of employees, knowledge level or sufficient time allocation. In addition, the company-related organizational and management factors as well as the attitude and competencies of non-executive staff may have a considerable impact.

Respondents assessed the presence of external barriers for the implementation of LM tools (Figure 4). The most significant barrier is poor awareness about the LM among enterprises which in conjunction with the limited access to LM financing solutions results in low interest of the supply chain partners (customers and suppliers) in the application of LM tools in order to improve the effectiveness of the cooperation. In the opinion of the respondents, the access to LM experts is considered relatively the least important barrier.
Introduction Barriers of Lean Implementation in Polish Manufacturing Sector. Marzena Frankowska, Justyna Myszak, Barbara Czerniachowicz

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Figure 4: Average assessment of external barriers for the implementation of Lean Manufacturing

In conclusion, in terms of the average assessment the companies examined do not rather not see significant barriers hampering them from the implementation of LM tools and when comparing both categories of LM pre-implementation barriers (Figure 5), it follows that external barriers are of slightly greater importance.

Figure 5: Average assessment of Lean Manufacturing pre-implementation barriers

Furthermore, there was examined the knowledge of respondents in terms of LM. The surveyed were asked to indicate LM tools known to them (prompted awareness), as presented in figure 6. On average respondents declared their awareness of more than four LM tools (4,4), with the most known of: 5S, Kanban and Kaizen.
Introduction Barriers of Lean Implementation in Polish Manufacturing Sector. Marzena Frankowska, Justyna Myszak, Barbara Czemiachowicz

Figure 6: Knowledge of LEAN tools

Followingly, the respondents were asked for their opinion on the benefits achieved by companies which have implemented LM (Figure 7). It appears that only 60% (12 companies) think that businesses actually benefit from the implementation of the LM. Approximately one third of respondents (6 companies) do not have the knowledge on this subject and 10% of respondents (2 companies) believe that companies do not benefit from the implementation of the LM.

Figure 7: Benefits from the implementation of LM in view of the companies without implemented LM

Interestingly, companies which claim that companies benefit from the implementation of LM had no problems to indicate the nature of benefits, such a faster job performance, better work organization or more timely order completion (Figure 8). In view of this, relatively fewer benefits concern the following barriers: lower production costs and higher product quality. In terms of the average, all answers are at a quite high level of 4,2 in scale to 5,0.
Introduction Barriers of Lean Implementation in Polish Manufacturing Sector. Marzena Frankowska, Justyna Myszk, Barbara Czerniachowicz.

Figure 8: The average assessment of the benefits following from the implementation of the LM in view of the companies not implementing LM

The obtained results translate into companies’ business plans in the future, 45 percent of them declare their intention to implement LM in their company (Figure 9).

Figure 9: Future intention to implement LM in the enterprise

As the survey has a probing character, prudent attention should be paid to the conclusions of the study. It follows from the survey results that businesses recognize both the internal and the external barriers which constrain them from the implementation of the LM. However, it seems that the main reasons are the financial factors. On the one hand, companies are not ready to bear the expenditure required to implement LM tools, and on the other hand, external financing sources to support this type of projects are limited. The businesses surveyed recognize that the barriers also include the complexity of management and production processes as well as competence and the mentality of the employees. In the opinion of the respondents, this is in turn connected with low level of dissemination and awareness of the LM benefits among enterprises. The research indicates the relatively small awareness and low pressure on streamlining processes of manufacturing companies within a supply chain. This is evidenced by the relatively insignificant response regarding interest and requirements of the customers and suppliers in this respect.

CONCLUSIONS
In conclusion, the subject of LM implementation barriers proves to be a very complex area both in terms of cognitive and research aspects. The literature abounds in analysis of barriers existing in connection with the implementation of tools LM. The new aspect is the introduction of time factor which separates the barriers occurring at the pre-implementation stage from the stage on which the companies are already involved in the implementation of the LM.

The research result analysis indicates that the companies surveyed have a relatively high awareness of the LM tools, potential benefits of their implementation and the barriers themselves. Their responses in a coherent way demonstrate the problem of inadequate resources, including the access to financing related to the LM implementation activity. They also note that the LM knowledge level among workers and enterprises is low, which limits the possibility to improve the effectiveness of the processes within the supply chains.

As a consequence, it should be noted that although the formulated research problems have been answered, and the answers refer to the studies found in the literature, the complexity of the subject matter requires further exploration.

REFERENCES

Macroeconomic Ratios of Republic of South Africa – Continental Context

Michał SCHEIBE
University of Szczecin, Szczecin, Poland
michal753@op.pl

ABSTRACT

The aim of the article is to define macroeconomic changes in Republic of South Africa during years 2000-2016 in the continental context. Considered ratios are GDP per capita (PPP), inflation, export dynamics, import dynamics, industrial and manufacturing production dynamics, unemployment and governmental debt. The article may help understand how stable is that economy, what are possible dangers and what has improved in it. Method used in the article is based on usage of statistical data from governmental and international institutions. Among sources are expert opinions, analysis and press publications.

Key words: South Africa, macroeconomics, development

INTRODUCTION

South Africa is the second biggest African economy with the population of 57 million people. As for tens of years it has struggled with social and economic tensions, the fall of Apartheid has brought a new hope for this commodity-rich country. However, the freedom obtained has not guaranteed success for everyone, nor even for those, who were fighting for it. Since the year of this fundamental new opening for society, businesses and politics, South Africa is looking for a new model of economic growth, which would provide more inclusion of the poorest majority of citizens in the wealth creation. In order to find out what is the background of it, it is crucial to look at macroeconomic ratios. They provide a scope of changes that have already happened and help define those, that are yet to come.

The purpose of this article is to describe macroeconomic ratios of South Africa in the period 2000-2016 and show their continental context. Such a task will enable to describe fundamental issues of a long term economic happenings in this economy and shed a light on what should be done in order to make it more resilient to both outer and internal shocks.

Methodology of the article includes analysis of macroeconomic data provided by the institutional and private entities, with additional consideration of professional literature concerning the subject and business media reporting. The chosen period is important because of a few factors: it was beginning of the century, BRIC economies started to gain more power and thus changed the global economic situation, it was a time of fading Asian crisis and stock market bubble burst in USA – in other words, the new era of economic reality began for both developing and already developed economies.

The research includes a variety of macroeconomic ratios: GDP, GDP per capita, GDP annual average dynamics, inflation dynamics, exports of merchandise and services dynamics, imports of merchandise and services dynamics, manufacturing dynamics, unemployment rate, governmental debt as percent of GDP. Such a combination enables to obtain complex information regarding total economic wealth production, stability of the payment system, trade dynamism changes, social inclusion and partial cost of development (in this case: governmental debt). Data extracted from the UNCTAD database concerns BOM5 in years 2000-2013 and BPM6 in the period 2014-2016. As the
first approach has been active until 2013, such a choice of data combination may enable easier comparisons with the earlier years, should other research be undergone in that matter. Since 2014 BPM6 is the only methodology available.

LITERATURE OVERVIEW

The chosen topic is widely discussed in the academic literature and the media, however concerned from various points of view. This work can add to the discussion by the variety of chosen factors and long term approach. The article by Krishna K. Govender Poverty and Inequality in South Africa: Exploring the Effectiveness of Macro Economic Policies states that although since 1994 when the democracy has been attained in the country and various policies have been implemented to fight poverty, inequality and unemployment, the effects are not satisfactory, as those three issues remain in power. Similarly, Lydia Assouad, Lucas Chancel and Marc Morgan in Extreme Inequality: Evidence from Brazil, India, the Middle East, and South Africa write that this country is characterized by the dual social structure, containing extremely rich group of people with income levels comparable to counterparts in high income countries and significantly poorer rest of the population. As an explanation, the historical influence of social segregation is being pointed out and economic institutions and policies. Miglas P. Mphela in The analysis of investment activity in South Africa : (1994-2015) notices that there is a limited research on investment in South Africa and strives to examine the determinants of such activity in this country. The research shows that there is positive relationship between economic growth, interest rate, inflation and investment and negative relationship between taxation and investment. The author also advises to create a tax system, which would capture the informal sector because various un-registered businesses operate without oversight. Important input into the discussion has been done by Ali Eren Alper in The Relationship of Economic Growth With Consumption, Investment, Unemployment Rates, Saving Rates and Portfolio Investments In The Developing Countries, where it is stated that concerning a group of Brazil, Russia, India, South Africa and Turkey, a 1% increase in saving rates increases economic growth by 0.50%, an increase of 1% in consumption expenditures increases economic growth by 0.41% and an increase of 1% in investment expenditures increases economic growth by 0.25%, whereas the increase in portfolio investments is insignificant, however its impact on economic growth is positive. The author adds that an increase in unemployment rates negatively affects economic growth. Moreover, in Structural unemployment labour market dynamics and the transmission of monetary policy in South Africa Vincent Dadam Kosga Djaowe writes that results of his research show that an increase in private sector productivity produces more desirable results with an increase in employment for both skilled and unskilled workers which translates into a decrease in overall unemployment. Brent Cloete and Samantha Munro in Reaping the socio-economic benefits of an inclusive transition to sustainability state that the lack of microeconomic reforms was a factor which contributed negatively to economic growth in South Africa and that the transition towards sustainable economic system may be stopped by the increasingly entrenched corruption and state paralysis caused by private interests. As an additional context, it is worth to recall the research done by Yu Hsing published as The Stock Market and Macroeconomic Variables in a BRICS Country and Policy Implications. The author states that South Africa’s stock market index is positively influenced by the growth rate of real GDP, the ratio of the money supply to GDP and the U.S. stock market index. On the other hand, it is negatively affected by the ratio of the government deficit to GDP, the domestic real interest rate, the nominal effective exchange rate, the domestic inflation rate, and the U.S. government bond yield. As such, in order to provide a ground for a developing stock market, the regulators should strive for an economic growth, fiscal prudence, a higher ratio of the money supply to GDP, a lower real interest rate, depreciation of the rand, and/or a lower inflation rate. The mentioned works show how crucial it is to provide sustainable macroeconomic environment for the country, as it affects not only businesses, but especially the society (although the effects of it are mostly seen in the long term). This article will show, what was
the state of South African economy in the long term. The before mentioned literature can provide even more insight into this topic and expand a discussion in a complex way.

MACROECONOMIC RATIOS

![GDP Graph](image)

**Figure 1: GDP of Africa and South Africa (millions USD, current prices)**

South Africa’s GDP has changed dramatically during the analyzed period. It has grown from 140 billion USD in 2000 to almost 300 billion USD in 2016. However, the growth of it has not occurred without disturbances. The first period of deterioration has taken place between 2000 and 2002, which has been also a time of passing so called Asian Crisis and the burst of the Internet Bubble. These happenings have affected global markets and so South Africa has not been free of that influence. After 2002 there has been a tremendous growth up to 300 bn USD in 2007, which has been a year of the beginning of another global crisis, this time the most severe since 1929. Having said that, the economy of South Africa has proved to be resilient to it. Although there was a slight downsize of the GDP value in year 2008 (to 287 bn USD from 299 bn USD in the year before), the economy has started to rebound from 2009, growing to more than 416 bn USD in 2011. What is concerning is the fact that since 2012 there has begun a constant deterioration of the GDP value, down to again little below 300 bn USD. During the period of 5 years, the economy has shrunk by roughly 25 %. It could the most alarming and shocking fact for any economy, but for the emerging market as South Africa, which could be considered almost destined to progress, it is an issue needing upmost complex intervention. The African continent has also shown a strong disturbance in building the size of GDP in recent years, however the long term success should not be denied – GDP has increased from about 650 bn USD to almost 2,5 trillion in 2014. The continent has been also susceptible to the global financial crisis, however it was not paralyzed by it in a long term – the growth is persistent, although not granted in the short term or medium term.
Similar situation has occurred with GDP per capita, which ultimately grew from 3 000 USD in 2000 up to about 5 300 USD in 2016 in South Africa, with the highest point of almost 8 000 USD in 2011. As the GDP may be more anonymous to perceive, GDP per capita shows more clearly how the consumer power and the standard of living has ergo been diminished. Changes of this value has also struck other nations of the continent, as the average value of the ratio has also deteriorated significantly.

Crucial at this point is to understand relation between GDP’s growth dynamics and inflation. If one would be to look at the percentage growth of the economy, it could be thought that it expanded, however, in reality the growth, which has occurred, has been erased by inflation. GDP’s expansion
by dynamics has seen a clear deterioration in the analyzed period whatsoever. In the beginning of 2000’s it kept the 3-4% speed (being downsized by the reminiscent Asian Crisis), but then increased up to around 5-6% in the years of global growth upswing in 2004-2007. Although the fall to -1,5% in 2009, it has swiftly came back to 3% level. Since 2011 the growth still took place given GDP’s dynamics, but, beyond pointed inflation, it has been sharply deteriorating to 0,30 % in 2016. Almost through the whole period, the growth of GDP of the whole Africa has been higher, although shaped in the corresponding pattern.

Figure 4: Inflation Dynamics of Africa and South Africa

Inflation has always had fundamental meaning for the economic development, as its presence deteriorates economic growth and development, being especially hurting for consumers. The importance it has concerning emerging/frontier markets is even more crucial, as such markets relatively quickly can improve or worsen their situation through economic diversification and political happenings. So there are two main reasons why inflation occurs: either it is widely understood instability or heating (and ultimately overheating) of the economy. In South Africa an upside in inflation’s level could have been observed during years 2000-2002 (crisis times). In years 2003-2004 it has rapidly fallen to less than 2 % (desired level in developed economies), but then, during years 2005-2008 has climbed every year up to almost 12 % in 2008. During the beginning of global crisis it has fallen again to 4 % and then reached in a more balanced way the level of around 6 % in consecutive years. In 2015 it has fallen once again to 4 %, just to jump back to more than 6 % in 2016. It all means that South Africa has strong tendencies for upbeat inflation, be it because of either global instability or global economic expansion. Nevertheless, it has sustained generally lower inflation than the rest of the continent.

South Africa is heavily reliant on exports of the commodities. 23 % of its sent to foreign countries products are ores and minerals with additionally 10 % of fuels (UNCTAD, 2018). As such, this economy is heavily connected to global prices swings of such goods. The biggest position is manufactured goods, which is a virtue of exports construction, as these can bring higher added value to the companies and workers. Nevertheless, exports dynamics of South Africa are variable. When concerning merchandise, it has fallen to about 0 in 2001, then it climbed up to almost 30 % in 2004, just to deteriorate once again to more than – 25 % in 2009, when the crisis hit. It bounced back quickly though, however for a short time – after 2012 dynamics of exports merchandise has stayed below 0, which proves of the structural inability to increase such trade in this economy.
Imports of merchandise dynamics shaped similarly, with a longer term of increased growth as of 2011. However, later there occurred a downfall, which stayed since 2013 until 2016 below 0 %, which may be tightly connected to the export industries of commodities and machines (by buying components and other machines from abroad). The pattern in comparison to the whole continent is very similar, which shows how such issues concern to some extent the whole geographic area. What may add to the long term prospects of this economy however, is the fact that China is South Africa’s biggest trading partner, with almost 40 % share in total trade, Germany is second (17%), United States third with 14 % and India fourth with 11 % (Mbatha, Monteiro, 2018). On the one hand, South Africa is heavily connected to some of the most developed economies in the world and on the other with some of the most dynamic and biggest developing markets in the world. It is a significant strength, as this country may find areas of the market in those economies to counter economic cycles and integrate its production into high value and high volume supply chains.
Services may have counter-cyclical influence on the economy, that is why their input into emerging markets is so crucial – they can help overcome commodity-bound character. The dynamics of exports and imports of services in South Africa did show some similarities to merchandise trade, however the spikes of growth during year 2003 outburst were higher (exports of services grew up to 70%). Imports in that matter were lower, with about 46% in the same year. Nevertheless, the dynamism has faded during the time of global financial crisis and, although it tried to get back on the path of growth, it had managed to do so only during three years (exports) and two years (imports). Since 2013, exports of services dynamics has occurred below 0% (imports since 2012). This data proves that there is a need to modify the structure of both trades (in matter of product type or geographical destinations), as there is a clear tendency of downfall, which may be mutually connected. Moreover, both peaks of 2003 and 2010 can be considered as a post-crisis comeback, rather than a sign of fundamental eligibility in competitiveness. Also in those cases the continent’s situation is similar.
Figure 8: Imports - Services Dynamics of Africa and South Africa (2000-2013: BPM5, 2014-2016: BPM6)

One of the most important economic factors is manufacturing dynamics, which show companies’ power in gaining speed of production – especially important, given the characteristics of South Africa’s significant position of manufactured products of 46 % in exports (UNCTAD, 2018). The way this ratio has been shaped throughout the analyzed years shows that sustaining high level of it is difficult and hardly occurs. The dynamics has been falling rapidly between 2000 and 2003, then it jumped back to stay through 4 years near the level of 5 %, and has nosedived to almost – 11 % in 2009. Since 2010 there was a stark downgrade tendency, but in 2016 a faint upbeat has been observed, which may bring optimism for the future development. The three enlisted periods of heightened growth provide some insight concerning nature of the downfalls, that they came after. As the 2003-2008 period was characterized by relatively better performance than in 2010-2016, the second one proves of more difficult to overcome economic environment. Until the financial crisis the South Africa’s situations seemed similar to the whole continent’s, however after 2010 there is a clear break-up of tight relation in a matter of rates (the pattern of shape persists whatsoever). There may be a chance of boosting manufacturing in the future, as the current government seeks to attract 100 billion USD in investment in order to boost the economy, in which fixed investment declined from 24 % of GDP in 2008 to 19 % in 2017 (Mbatha, Cohen, 2018).
Another sign of the structural inability to provide dynamic economy is very high unemployment, which has been sustained in the whole period of the analysis. The differences between peaks and lows were barely significant as the lowest level was 22.53% in 2007 and the highest was 27.14% in 2003, but in the beginning of the researched period it was 23.27, and at the end it was 26.55 in 2016. It shows how the job market is paralyzed in South Africa, unable to provide meaningful inclusion of the vast part of the population during the period of 17 years. Moreover, since 2008 there is a dominant growing tendency with a more abrupt increase in 2016. Throughout almost the whole analyzed period South Africa has seen a significantly higher unemployment than the whole continent, which shows that this very issue is characteristic of this economy and should be tackled in a focused, specifically aligned way.

Figure 9: Manufacturing Dynamics of Africa and South Africa

Figure 10: Unemployment of Africa and South Africa
The last sign of fundamental trouble of the South African economy is its governmental debt. As between 2000 and 2008 it has been mostly diminishing from 43% to 28%, the stakes have changed radically in connection to the global crisis. Since 2008 there has been a successive growth of it up to 52% in 2016. As in many other developing or developed economies the governmental debt has increased during that time, for South Africa it is even more dangerous as its exports and imports are highly cyclical, GDP’s growth rate generally is decreasing and unemployment stays stubbornly at very high levels. As such, neither exports, nor internal consumption have been able to turn the tide in decreasing governmental debt. It would be less problematic if at least this debt would be decreasing in view of an inefficient economy (in such a case, government could in the future modify economy’s structure with its interventions), but what is most alarming is the fact that other macroeconomic factors are deteriorating nevertheless increasing debt.

The African continent state of liabilities given this ratio has been very high at the beginning of the analyzed period (near 100%), however even until 2013 there was a dominant strong tendency of decreasing those amounts (it should be further researched to which extent this diminishing has been caused by the debt pay-ups, and to which by defaults). South Africa has been also striving to lower its levels in that matter, which is even more impressive as the ratio has not been high (around 40% at the beginning, closer to 30% at the break-out of the global financial crisis. Unfortunately, as it has been present in many countries at that time, also in this case the debt levels has risen – South Africa has seen this upbeat before the whole continent, which may be caused by stronger ties of the economy with international manufacturing and commodities. Since 2008 the debt level has increased dramatically, up to 51.6% of GDP in 2016. However, as the curve is flattening, it could be a sign of overcoming debt’s growth.

**Figure 11: Governmental Debt of Africa and South Africa**


**CONCLUSION**

South Africa’s economy is undergoing a time of structural dilemmas and facing a hastening need of reviving its dynamics. The GDP growth rate, although at a relatively high levels at the beginning of the analyzed period, has been deteriorating, with short term exceptions, since 2007. The overall GDP value has fallen significantly since 2011. Inflation has been heightened throughout almost all
time of the research, as the average rate of it was 5.82. Such an inflation underscores real economic growth. The rate of exports and imports of merchandise dynamism has fallen rapidly since 2010, with rates below or near zero in the last five years of the period. Similar situation could have been observed in matter of services trade. In both cases, alleviated levels of dynamics should be treated as after-crisis bounce-backs, rather than sustainable long term features – it is even more troubling, as it could be desired for services trade to be counter-cyclical in regard to merchandise trade. Analogically, the dynamics of manufacturing can be viewed also as changing between frontiers of a few years periods, with a 2010-2015 term also showing undermining weakness. The most socially striking ratio among analyzed is unemployment, which in case of South Africa has been specifically high and almost imperturbable throughout the whole researched time. On the other hand, as the most striking fiscally is governmental debt addition since 2008, which, if not stopped, will further constrain possibilities of state economic interventions, whereas those would be investments or social programs. Overall, South Africa is at an utmost moment of economic alert and needs repairing immediately, before the situation becomes more damaging.

In matter of comparing South Africa to the whole continent, there are numerous similarities. Tendencies of changes are mostly corresponding. Luckily for the whole continent, the inflation dynamics has been significantly downsized to levels similar in South Africa, however both entities should be warn of the rising debt levels, which after global financial crisis have moved towards strong correspondence. In matter of international trade, the whole continent is being susceptible to economic cycles. Two most striking differences are on the other hand unemployment, of which South Africa has sustained an alarmingly high level. Although the whole continent has a much lower level of it, both subjects do not show strong long term tendency to resolve it. Second most important issue described here is a GDP annual growth rates of South Africa, as in almost the whole analyzed period has been lower than of the whole continents – although it could be expected as this economy is much more developed than most of the other countries of the area, it is still a developing market, which could see higher rates. Last, but not least – GDP growth rates of both South Africa and the African continent has encountered downward pressure generally since the spill-over of the global financial crisis. It shows how important it is for both entities to find a way of development in mind with resilience, inclusion, dynamism and, perhaps most importantly, long term outlook.

REFERENCES


ABSTRACT

The problems of entrepreneurial attitudes is one of the contemporary areas of research on broadly understood entrepreneurship. The relevant literature provides many examples of attempts to classify the factors which trigger the creation and development of entrepreneurship. There are also many classifications of the traits which describe an entrepreneur, focusing on characteristics such as creativity, persistence, drive for achievement, risk-taking, dominance, decision-making etc. A review of the publications available on the subject has shown that entrepreneurial attitudes have been described on multiple occasions in relation to various research subjects, such as women, students or the unemployed, while relatively little attention is paid to the problem of shaping entrepreneurial attitudes in relation to the place of residence. The aim of the article is to characterize entrepreneurial attitudes of young people with regard to the size of their place of residence. Those attitudes were examined on the basis of self-assessment, as well as from the point of view of the barriers to opening their own businesses and the factors that would motivate young people to do so.

The article uses the results of own research carried out among young people aged from 18 to 25. The research was carried out using a group administered questionnaire with a group of 985 students in the final grades of upper-secondary schools and university students, adopting the criterion of place of residence. The questionnaire covered many aspects which influence the formation of entrepreneurial attitudes, such as personality traits of the respondents, determination of their entrepreneurial intentions, as well as identification of the barriers to and factors that promote the development of entrepreneurship. Statistical data – Economic Activity of the Population in Poland in Q4 2017 – published by the Central Statistical Office in April 2018 were also used. The results of the research are presented in the form of graphs and tables, using statistical tools to characterize the factors examined.

The results of the research indicate that the entrepreneurial attitudes of young people vary depending on their place of residence. Particular notice should be taken of the fact that young people see clear deficiencies in their knowledge on how to run their own business, which they believe need to be
remedied. Therefore, providing them with the relevant information should result in an increase in entrepreneurial attitudes and, in general, socioeconomic development.

The results of the research revealed significant differences in the attitudes of young people depending on their place of residence, therefore how entrepreneurship is supported should be differentiated due to this characteristic.

**Keywords:** entrepreneurship, entrepreneurial attitudes, young people, place of residence

**INTRODUCTION**

The issue of entrepreneurial behaviours requires an interdisciplinary approach. The process of shaping of an entrepreneurial attitude depends on many factors, including the environment in which the person functions, situational factors, social and cultural norms, and upbringing. All these elements determine one’s personality traits and their way of thinking.

![Figure 1: The process of shaping an entrepreneurial attitude](source)

Each culture, and even each social group within the same culture, is dominated by different values, norms and patterns of behaviour with which an individual may identify. This means that in addition to economic effects – including personality traits that enable efficient and effective implementation of goals, as well as a certain way of conduct which facilitates starting a business and managing an enterprise – an important role is also played by the entrepreneur’s personality and behavioural characteristics, as well as the possibility and scope of impacting the community to a specific extent (see also: Davidsson, Delmar, Wiklund, 2006, pp.21-38). This is confirmed by research carried out in Great Britain by Athayde, who has found significant differences between the entrepreneurial behaviour of young people from different ethnic groups (Athayde, 2009, pp.355-570).

In the literature on the subject, attempts have been made to classify the factors that trigger the formation and development of entrepreneurship and the traits that characterise an entrepreneur. Entrepreneurship is a specific attitude of a person towards the world and the people around them,
expressed through creative and active pursuit of improving the existing state of affairs. Entrepreneurship attitude is traits of personalities – describing a particular human behaviour and action focused on innovation, ability to accept changes, spot opportunities, and take risks (Malecka, Łuczka, Šebestová, Šperka, 2017, pp.137-157). Entrepreneurship is the result of a combination of various intermingled factors and internal and external conditions, which can both stimulate and limit, or inhibit, the development of entrepreneurship. An entrepreneurial person is initiative- and risk-taking, flexible, creative, problem-solving, leadership-oriented, and hard-working. Entrepreneurial attitude can be regarded as a specific component of cultural attitude, reflecting persistent beliefs, norms and values (Bosma & Schutjens, 2011, pp.711-742). It is observed that in shaping entrepreneurial attitudes there has been a heightened recognition of the role of ‘soft’ factors such as social capital (Fritsch, Story, 2014, pp.939-954).

Entrepreneurial traits can be analysed in multiple ways and according to a variety of criteria (see: Casson, 1982; Thompson, 2009, pp.669-694; Wach, Wojciechowski, 2016, pp.83-94). The purpose of the research presented in this article was to learn about entrepreneurial predispositions and willingness to run a business, the barriers to and the factors that motivate undertaking business activity in relation to the criterion of place of residence. The considerations contained in the article are based on the results of the authors’ own research. The study covered 985 people aged 18 to 25, who were students in the final grades of upper-secondary schools and university students.

**Entrepreneurial attitudes and places of residence**

Regional culture and the socio-economic environment of a specific region may affect entrepreneurial attitudes (Kibler, Kautonen & Fink, 2014, pp.995-1015). The criterion of place of residence is one of the key features taken into account in labour market statistics. Its main effect is the diversification of the professional position of people living in rural areas, on the one hand, and in urban areas, on the other hand. The difference in employment rate by place of employment has over the last five years been constant at 0.2 to 0.6 percentage points (pp). In this period, the employment rate for urban population increased by 3.7, while for rural population – by 3.3 pp (Figure 2).

![Figure 2: Employment rate in Poland by place of residence [%]](image)

Source: Own chart based on data from CSO, 2017.

An analysis of statistical sources shows that in recent years the difference between the unemployment rate of people living in the city in relation to people living in rural areas has increased and is currently
at 0.5 pp (Figure 3). It is worth noting that in the last five years the unemployment rate in Poland has decreased by more than 50%, and at the moment it remains at 4.7% for urban population and 5.2% for rural population (see also: Małecka, 2016, pp.91-122).

Central Statistical Office data show differences between the professional activity of people living in cities and people living in the countryside. Urban population constitutes 60.3% of all employed in Poland. The vast majority are wage workers – 70.4% of rural population and 85.6% of urban population, of which nearly one in three urban wage workers work in the public sector, compared to 17.6% of rural area inhabitants. It is also worth stressing that rural residents work part-time more often than their urban counterparts. Inhabitants of villages are definitely more frequently involved in helping family members free of charge compared to those living in a city (5.7% and 0.6%, respectively). There are more self-employed people living in a rural area than in the city: 23.8% of working rural residents and 13.8% of city dwellers own a business (Figure 4). Every third person from a city who runs their own business is also an employer, while the same is true for 14.9% of rural residents.
DEPENDENCE OF ENTREPRENEURIAL ATTITUDES ON PLACE OF RESIDENCE BASED ON OWN RESEARCH

Research methodology
The research was carried out using an anonymous questionnaire. An attempt was made to define entrepreneurial attitudes by identifying certain internal traits and through self-assessment by the young people in the studied area. The authors inquired about the respondents’ plans regarding the creation of a business and about their opinion on the barriers to entrepreneurship development and the determinants of entrepreneurial behaviour. The group-administered questionnaire was conducted in January 2017 among a group of 985 people in the Wielkopolskie (Poznań) Province. The research sample included people aged 18 to 25. The sample was selected randomly. Women accounted for 59.5% of the respondents, while men for 40.5%. The questionnaire adopted the criterion of the respondents’ place of residence, according to the following breakdown: rural (45.4% of the respondents), urban with population of <4.9 k (9.7%), urban with population of 5 to 49 k (18.7%), and urban with population of >50 k (26.2%).

Self-assessment of entrepreneurial traits
Self-assessment was used to examine certain internal traits among the respondents. According to the results obtained, 27% of respondents are ambitious and stubborn in their pursuit of goals. The vast majority of respondents who believe to have a strong character are residents of cities with a population of over 50,000 (32%). This trait was, on the other hand, the least frequently indicated by respondents living in villages (26%) and cities with a population of 5,000 to 49,000 (22%). Less than a quarter of the respondents (19%) consider themselves to be resourceful, bold and full of initiative, of which the largest percentage are rural residents, however the differences as regards this trait are negligible in relation to one’s place of residence. Regardless of the place of residence, every third respondent (34%) perceives themselves as a flexible person, capable of adapting to the circumstances. 29% of the respondents described themselves as having rich imagination and diversity of ideas. This attribute was mostly indicated by those residing in rural areas (Figure 5).
Figure 5: Wealth of imagination and diversity of ideas in the opinion of the respondents [%]
The respondents are perfectly aware of having both vices and virtues, therefore it can be concluded that they know their strengths and weaknesses. It is noteworthy that more than half of the respondents believe that they can easily see favourable circumstances and take advantage of an opportunity. The young people indicated that they were able to handle uncertain situations. According to the survey, the respondents, regardless of their place of residence, declare to have basic entrepreneurial characteristics. The research results did not indicate any significant differences in the self-assessment of personality traits between respondents from locations of different sizes, which allows to conclude that their self-image is not significantly differentiated with regard to this factor.

The results of an insight into perceiving oneself as an entrepreneur are interesting. The authors examined the sense of being an entrepreneurial person. The strongest feeling of being an enterprising person is found in rural population (44.5%), while among the inhabitants of small towns with a population of 4,900 or less the feeling was the weakest – those respondents most often indicated that they are rather not or definitely not entrepreneurial (35.4%) (Figure 6).

Figure 6: Sense of being entrepreneurial in the opinion of the respondents [%]

Entrepreneurial intentions
In a knowledge-based economy, it is essential to have an adequate understanding of how to start and run one’s own business. According to the research results, the respondents assess their competences in this area as quite poor. Every third respondent is unable to even determine the level of their knowledge. Only 6% of all respondents claim that their skills would definitely allow them to run their own business, while 20% believe that they would perhaps be able to do so. 39% of the respondents claim that they do not have sufficient competences in this area. An analysis of the dependence between the knowledge at hand and the place of residence indicates that competences in this area are assessed the highest by inhabitants of larger cities and the lowest by inhabitants of rural areas. An important issue from the point of view of the research was the potential readiness to set up one’s own company.
An analysis of the data obtained permitted the formulation of certain conclusions about the entrepreneurial intentions of young people. The research shows that 11.8% of the respondents are definitely planning to start their own company, 35.5% are unable to specify their plans in this respect, while more than every fourth respondent declares that they do not intend to establish their own business. When the issue of willingness to start a company is analysed from the point of view of place of residence, it transpires that 13.2% of inhabitants of urban areas with a population of over 50,000 are definitely planning to set up their own business in the future, but this declaration was made by only 5.2% of people living in small towns with a population of up to 4,900, who, at the same time, were the most likely to declare that they did not intend to start their own business (Figure 7).

![Figure 7: Willingness to carry on business activity [%]](image)

The results of the research revealed large dependence between one’s business knowledge and skills and the willingness to set up their own company (Table 1). It turns out that 62.3% of the people who highly rate their competences in setting up and running a business are planning to have their own company. There is also another clear trend: the worse the young people assess their knowledge, the less interest they have in starting their own business.

<table>
<thead>
<tr>
<th>Are you planning to start a business in the future?</th>
<th>Do you think that your knowledge and skills are sufficient to run a business?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Definitely yes</td>
<td>Definitely yes</td>
</tr>
<tr>
<td>Definitely yes</td>
<td>62.3</td>
</tr>
<tr>
<td>Rather yes</td>
<td>19.7</td>
</tr>
</tbody>
</table>

Table 1: Assessment of one’s knowledge and skills to run a business and willingness to set up a business [%]
Barriers to taking up business activity

The willingness to undertake entrepreneurial activity and the potential of young people are often hampered by a number of barriers and obstacles (Wellalage, Locke, 2012, pp.1-17). Such restrictions, the typology of which is quite varied, may have a negative impact on the development of entrepreneurship. According to the results of the research, the key barrier in this respect, regardless of any criteria, are financial resources, which were indicated by 50% of all respondents (Łuczka, Małecka, 2017, pp.375-387). Financial problems are mostly feared by the residents of large cities with a population of over 50,000 (55.8%), followed by people living in villages (50.1%) and in towns with a population of 5,000 to 49,000 (47.9%). Another obstacle is the risk associated with running your own business, which was indicated by 34% of the respondents. It should be emphasised that the risk is related, to a certain degree, to the lack of adequate knowledge, which was indicated as a barrier by 24% of the respondents. In the literature on the subject matter, risk is given twofold consideration: (1) as a barrier which prevents one from making any risk-bearing decisions, and (2) as a factor which favours entrepreneurial activities, where risk is treated as an opportunity for success. Risk is feared the least by residents of large cities (30.6%) and rural areas (31.8%), while for the inhabitants of small towns with a population of up to 4,900 (43.8%) it is the worst obstacle. Every third respondent (31%) living in a large city (with a population of over 50,000) indicated lack of an idea for their own business as a barrier, while for people living in small towns (<4,900 inhabitants) and in rural areas this barrier was the least troublesome (16.7% and 19.7% respectively). Stress related to running a business and fear of failure are the most serious constraints on the path to entrepreneurship for rural residents (22.6% and 25.3% respectively). Starting a family and bringing up children are, on the other hand, the largest barrier to people living in small towns with a population of 4,900 or less, who, at the same time, were the least likely to indicate stress as an obstacle to running their own business (15.6%). Failure of their business is feared the least by people living in large cities with a population of over 50,000 (Figure 8).
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Figure 8: Barriers to running their own business in the opinion of the respondents [%]

A high percentage of the respondents indicated high costs of self-employment (46.26%) and extensive bureaucracy (29.3%) as a significant barrier. Every third respondent pointed out that the problem are also high prices for renting commercial space (33.6%). Despite the fact that financial resources seem to be the major obstacle, 32.7% of the respondents do not mention any difficulties in obtaining information on how to acquire financial support.

Motivating factors for entrepreneurship
The decision to start a business is encouraged by certain motivating factors. In the opinion of young people, owning a company wins greater social recognition than a full-time job – the vast majority of the respondents, regardless of the size of their place of residence, believed that. Over half of the respondents believe that full-time work is less time-intensive than running a business. Only every third respondent (32.7%) claims that a full-time job provides better social security conditions than self-employment. The predominant factor motivating the establishment of a company, regardless of the size of the place of residence of the respondents, is the desire to generate higher income (Gano, Łuczka, 2017, pp. 99-113), however, it should be emphasised that respondents living in cities with a population of over 50,000 were the most motivated by this aspect (64.7%). The second most prevailing factor is the ability to decide about oneself in terms of employment, which provides the strongest motivation to residents of large and medium-sized locations (from 5,000 to over 50,000 inhabitants) (50.4% and 49.5% respectively), while residents of rural areas and small towns with a population of up to 5,000 are slightly less motivated by it (47.7% and 44.5% respectively). An important incentive is also the ability to independently decide on the amount of working time. The possibility of development in the areas of interest of the respondents as a motivating factor is highly diversified. This factor predominantly drives the inhabitants of large cities with a population of over
50,000 (41.5%), but rural residents are definitely less inspired by it when it comes to the decision to start their own business (28.9%). An important issue for people living in large cities (over 50,000 inhabitants) is the ability to choose employees – this factor was indicated as the motivator for opening their own business by 22.9%. This factors is, on the other hand, the least important for inhabitants of small towns with a population of up to 4,900 (11.5%) and those living in villages (16.6%). Risk, regardless of the place of residence, is not perceived by the respondents as a motivating factor, which is further confirmation of the barriers indicated by the respondents. The fear of losing a job and the possibility of lacking a source of income is most motivating for the inhabitants of small towns with a population of up to 5,000 (Figure 9).

![Figure 9: Motivating factors for starting an own business [%]](image-url)

The possibility of losing a job or unemployment are certainly among the factors which drive entrepreneurship. According to the research results, 48.2% of the respondents are afraid of unemployment. The prospect of losing their job is mostly concerning for rural residents (49.8%), while those living in large cities with a population of over 50,000 are the least worried about it in comparison with others. Despite the fact that this factor is among the motivators for starting one’s own company, the results of the research revealed a tendency according to which as the sense of threat of unemployment increases, the willingness to set up one’s own business decreases.
The literature on the subject often points to the significant stimulating effect of the entrepreneurial attitudes of one’s family, friends and other people in the immediate environment on the willingness to start a business. The research results showed that 70.1% of the respondents know a person running their own businesses in their immediate environment. An analysis of the data showed a significant correlation between the willingness to open one’s own business and the presence of business owners among the respondent’s close contacts. The percentage of people who have a close relation with an entrepreneur and are planning to open their own business in the future is significantly larger.

CONCLUSIONS
The results of the research on entrepreneurial attitudes of young people aged between 18 and 25 have shown that they vary to a different extent with regard to the criterion of their place of residence. The respondents assess their knowledge and skills in the field of running their own business very poorly, and the worse they assess their competences, the less they are interested in setting up their own business. Therefore, it can be concluded that providing them with appropriate knowledge should result in an increase in entrepreneurial intentions and the number of new businesses. The inhabitants of rural areas and small towns with a population of up to 5,000 rate themselves the worst in this respect, which means that actions in this area should be more intensely targeted at these two groups.

Entrepreneurial attitudes of the respondents are laden with many barriers and limitations, which vary to different degrees. The major barrier is (1) the lack of financial resources needed to set up and run their own business – especially for people living in large cities with a population of over 50,000. Another significant barrier to entrepreneurship is (2) the risk associated with running a business – in particular, this risk hinders entrepreneurial behaviour among people living in towns with between 5,000 and 50,000 inhabitants, and, to a lesser extent, among residents of large cities and villages. Interestingly, an important barrier is also the lack of idea for their own business among people from large cities with over 50,000 inhabitants. A noteworthy obstacle is (3) the lack of knowledge in the field of economic activity. Stress related to running one’s own business and the fear of failure are particularly hampering to the entrepreneurial activity of people living in rural areas, which is why undertaking activities to support rural entrepreneurship could prove particularly valuable.

The fundamental factor driving the decision to start a business is (1) the willingness to generate higher income and (2) the possibility of being self-employed. Those living in large cities with over 50,000 inhabitants are also motivated by (3) being able to pursue an interesting field, which is much less important for rural residents. The research results showed that the previous unfavourable image of an entrepreneur, based on negative stereotypes, has changed and now, in the opinion of the respondents, owning a company provides greater social recognition than a full-time job – which is also a motivator for starting one. The traditional motives for having a company, such as (1) risk-taking and (2) fear of unemployment (which is currently a barrier rather than a motivator), are losing their weight.

An important issue is, therefore, the formulation of an appropriate policy for stimulating and developing entrepreneurship. The results of the research have revealed significant differences in the attitudes of young people depending on their place of residence, which is why the focus and intensity of entrepreneurship support should be differentiated having regard to this parameter.
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On the Economy of Culture. Case Study of the National Museum in Szczecin

Anna Suchocka
University of Szczecin, National Museum in Szczecin, Szczecin, Poland
2189@usz.edu.pl

Katarzyna Koziol-Nadolna
University of Szczecin, Szczecin, Poland
Katarzyna.Koziol-Nadolna@usz.edu.pl

ABSTRACT
This article aim is to analyze and assess the tool of measurement of the economic situation of the National Museum in Szczecin. As well as reflection on better, adequate solutions assessing the economic condition of cultural institution in the context of the theory of cultural economy. The article uses the method of secondary data collection and analysis, inductive-deductive inference, critical literature review and case study. The article has a cognitive objective, it consists of a theoretical part, concentrated on the area of cultural economics, extended by selected available literature. The practical part presents a case study: a list of financial and non-financial indicators regarding the economic situation of the National Museum in Szczecin. A non-profit cultural institution cannot escape the ‘cost disease’ However must survive, grow and compete with other service providers in the cultural sector, or even entertainment and recreation. In annual reporting, museums use measures whose values should reflect the level of success achieved within the consumed budget and acceptance for the duration of ‘cost disease’. The authors postulate the need to construct new quantitative and qualitative measures to obtain a real view of the economic situation of Polish museums. To measure the economic condition of a cultural institution, authors suggest for example, the Fibonacci sequence.

Key words: economics of culture, cultural economy, cost disease, case study, National Museum in Szczecin

INTRODUCTION
Cultural activity has been marketed. Undoubtedly culture is subject to all the laws of the market. Due to the inclusion of routine factors and rules of production, this is cultural industry. It is obvious that public intervention in the culture sector implies disproportionately high costs to benefits. As well as participation in these costs of a large majority contrasted with the possibility of the participation which is limited to few (Towse, 2011, pp. 14-16). The policy of contemporary states always contains an element of cultural policy. Public financing for the creation, production, exploitation and consumption of cultural goods is commonly practiced by the majority of the states, even the most neoliberal (Towse, 2011, p. 21).
Public institutions of culture are deficient by their definition, only few of their products are profitable. Public museums today, although they are mainly financed from the state budgetary resources, are institutions competing with each other and with other cultural institutions, and even the private sector. In this approach, managing a modern cultural institution becomes a managerial challenge. The success is to find the balance of two equally important spheres of value: artistic and economic (Matt, 2006, p. 27).
The economical efficiency of museums is realistically unmeasurable. Both, Polish and the worldwide museums, museums use dedicated designed indicators to quantify their activities. These indicators are adequate in building arguments for the conduct of cultural policy. Nevertheless, it is easier to attribute them to social rather than economic value. Among these indicators compiled in the annual reports are data on visitors, the number of exhibitions, the number and type of educational and popularizing activities, the number of scientific publications, the number of conserved objects, the number and value of new acquisitions, fixed expenditures for buildings maintenance and employment, number of museum objects (Towse, 2011, p 267).

The genesis of the economics of culture results directly from the debate on the problems of financing culture from public funds in the conditions of a market economy and its foundations, the so-called cost diseases (Baumol, Bowen, 1966). The aim of this paper is to analyze and evaluate tools for measuring the economic situation of the National Museum in Szczecin. As well as reflection on better, adequate solutions assessing the economic condition of cultural institution in the context of the theory of cultural economy.

LITERATURE REVIEW

W. Baumol and W. Bowen, in work Performing Art. The Economic Dilemma, published in 1966 were the first who consider the issue of the economics of culture. The authors formulated a hypothesis explaining the rising costs of producing artworks related to the unavoidable revenue gap. As economists, they primarily focused on the aspect of cultural non-profit character (the so-called Baumol effect, cost disease). Moreover at the basic need to fill this gap with private or public financing. They claim that it is necessary to subsidize a culture. By definition, culture cannot be profitable in economic way. Creation of material and immaterial cultural heritage gives a value in itself (Towse, 2011, pp. 39; 43; 48; Nierenberg, 2015, pp. 378, 381). Macroeconomists of the twentieth century (J. M. Keynes, J. K.Galbraith, L. Robbins) were in agreement with public patronage over national heritage, especially galleries and museums. As an argument they define art, like education, as this one which brings general social benefits, prosperity and wealth. This approach is currently in force.

Each modern national economy includes expenditure on the public sector, and in it expenditures on education and culture. The public sector is a challenge for the modern economy. As consequence, the challenge is its proper development, which depends on social, economic and political factors (Kosińska, 2012, p 139). State and local self-government’s cultural institutions are in the public finance sector (chapter 3, article 9, item 13 of the Act on Public Finances). Museums are considered both as cultural industries and as creative industries (Lewandowski, Mućk, Skrok, 2010, p 17). A deep analysis of the economy of prosperity and public finances was conducted by Towse (2011, pp. 182-214) explaining the necessity of state intervention in the cultural sector. Cultural policy is a resultant of the effort undertaken by the whole community and could not be achieved with the involvement of only private persons or the market. The multi-component concept of well-being, beyond material prosperity, which can be included in a numerical value (e.g. by means of measurable income and wealth or GDP), is also built from elements that are very individual goods (including health, freedom, joy), sometimes public or collective (e.g. security), which cannot be bought from the market at all.

It is problematic that the majority of state policy instruments potentially increasing prosperity, at the same time, cause one's situation to deteriorate (dilemmas related to the amount of taxes, tax thresholds, distribution of collected funds, including public sector financing, and the culture sphere in it). The solution is so-called Kaldor-Hick's compensation principle, which in its general assumption claims that the ultimate point of reference is the improvement of net prosperity, in which those who gain will compensate losses for those who lose (Towse 2011, pp. 185). Towse (2011, pp. 182-214) explaining the necessity of state intervention in the cultural sector, states that culture and creativity have the features of public goods, and at the same time improve the quality of life. It is important to find the most accurate answer to the question of who exactly will benefit from...
investing in culture (now and in the future), and who will have to cover the current costs associated with it. This question is strengthened especially in the case of museums that, at their current time, collect the available cultural heritage from the past and the present. They run their business based on this collection, both, in the current formula and formula directed to future generations.

Cultural heritage is a broad term, it refers to all material objects created by man, among others archaeological discoveries, architectural discoveries, works of art, artifacts and intangible assets, including knowledge, traditions, skills, beliefs and natural heritage.

Heritage understood in this way is largely public property. Its maintenance is an element of the cultural policy of the state, which, regardless of whether it is public or private, protects this heritage with special legal provisions and financial support (Towse, 2011, pp. 254-255). The collections in the Polish national museums is largely property of these museums. It is significant that in Western literature (Towse, 2011, Thorsby, 2010) and selected Polish positions (Ilczuk, 2012; Folga-Januszewska and Gutowski (ed.), 2011) the local social, economical and political situation is the starting point for illustrating examples of cultural economics.

The characteristics of the contemporary public museum in Poland results directly from the provisions of the Act of 21 November 1996 on museums (Chapter 1, Articles 1-4) and legal acts concerning cultural activities and protection of monuments. Moreover the definition adopted at the 22nd ICOM General Conference in Vienna on August 24, 2007 (Murzyn-Kupisz, 2016, pp. 7-8, Borusewicz, 2012, p. 40) where museum is a permanent non-profit organization serving the public and its development, open to the public, which collects, preserves, subjects research, disseminates and shows the material and immaterial heritage of man and his environment for educational, scientific and entertainment purposes (ICOM, 2018).

According to Towse (2011, p. 264), museums in economic terms are multi-product enterprises which are a combination of visitor services (offer collection at exhibitions, educational services), complementary services (including shops, cafes) and services invisible to visitors (such as: collection storage, maintenance, research on collections, development of expert knowledge and its popularization).

RESEARCH METHODS

The article uses the method of secondary data collection and analysis, inductive-deductive reasoning, critical literature review and case study. The reason for such choice is the fact that after reading the general remarks and theories, the individual example is an important and practical complement. This method has an illustrative chart and allows to explore the phenomenon or problem by analyzing a real, specific case (Dańda, Lubecka, 2010, pp. 4-6). An element of authors own contribution is a confrontation of these contents, formulated conclusions and elaboration in the summary, as well as analysis of data collected from the National Museum in Szczecin (NMS). The case study was developed based on the research carried out at the NMS. The research period covers the years 2015-2017. The survey was conducted from 10 to 24 August 2018 at the institution's headquarters.

THE NATIONAL MUSEUM IN SZCZECIN (NMS) – CASE STUDY

In order to illustrate the values of indicators (measures) which measure the success of a museum (also the so-called economic one, though it would seem more apt to call it para-economic), below is a summary of the results achieved by NMS from 2015-2017.

Table 1: List of indicators from NMS’s annual reports from 2015-2017

<table>
<thead>
<tr>
<th>NO.</th>
<th>INDICATOR/unit of measure</th>
<th>YEAR</th>
</tr>
</thead>
</table>

On economy of culture. Case study of The National Museum in Szczecin. 1 Katarzyna KOZIOŁ-NADOLNA, 2 Anna SUCHOCKA 275
<table>
<thead>
<tr>
<th></th>
<th>2015</th>
<th>2016</th>
<th>2017</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Number of visitors/person</td>
<td>110,017</td>
<td>165,921</td>
<td>154,987</td>
</tr>
<tr>
<td>2. Number of exhibitions/piece</td>
<td>36</td>
<td>46</td>
<td>37</td>
</tr>
<tr>
<td>3. Number of educational and popularization activities/piece</td>
<td>1021</td>
<td>1366</td>
<td>1154</td>
</tr>
<tr>
<td>4. Number of scientific publication/piece</td>
<td>5</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>5. Number of preserved objects/piece</td>
<td>914</td>
<td>561</td>
<td>736</td>
</tr>
<tr>
<td>6. Number of new acquisitions/piece</td>
<td>63</td>
<td>34</td>
<td>337</td>
</tr>
<tr>
<td>7. Value of new acquisitions/paid in:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PLN</td>
<td>209,847,30</td>
<td>1,020,836</td>
<td>225,624</td>
</tr>
<tr>
<td>EUR</td>
<td>25,000</td>
<td>176</td>
<td>19,300</td>
</tr>
<tr>
<td>8. Number of employees/person</td>
<td>173.75</td>
<td>182.5</td>
<td>182.45</td>
</tr>
<tr>
<td>9. Salary costs/PLN</td>
<td>6,776,492</td>
<td>7,497,552</td>
<td>7,999,826</td>
</tr>
<tr>
<td>10. Costs of maintaining buildings/PLN</td>
<td>1,025,090</td>
<td>1,166,963</td>
<td>1,101,239</td>
</tr>
<tr>
<td>11. Total budget/PLN</td>
<td>14,957,507</td>
<td>14,344,162</td>
<td>15,022,937</td>
</tr>
<tr>
<td>12. Income from tickets/PLN</td>
<td>330,153.45</td>
<td>524,409.39</td>
<td>531,834.44</td>
</tr>
</tbody>
</table>

Source: NMS, data aggregation and own elaboration.

The preliminary analysis of Table 1 points out that although all indicators are measurable in specific units of measurement, only some of them are directly financial indicators (value of acquisitions, employees costs, costs of buildings maintenance, total budget, income from tickets). The first six indicators may not yet directly reflect financial values (including the actual cost of a single visitor's visit at the facility, the cost of a single organization of a popularizing and educational activity or participation of a specific participant, the cost of issuing a specific scientific publication, the cost of a specific permanent exhibition – long-term or temporary, cost of the preservation of the single object which depends on the conservation needed in conservation plan, etc.). The above table is a list of the twelve examples of most popular indicators from museums which serve to report on the activity and measure the work efficiency of the institution.

The presented values of the measures give a positive assessment for the institution. At the same time, the actual analysis of the financial condition of this institution, despite its exemplary functioning reflected in the high indicators achieved, pointed to financial difficulties to keep the planned budget without achieving loss. Therefore, these indicators do not fulfill the function of a real diagnosis and are not conducive to a reliable assessment of the museum, they are rather an element of the implementation of cultural policy. The meters have been designed to show the success of the institution and its organizers.

**DISCUSSION**

An interesting point of reference for information collected at the NMS will be the data collected in 2016 by the Central Statistical Office from of all museums in Poland. At the end of 2016, the total number of museum collections amounted to 16.0 million objects. In the same reporting period, some of their collections were presented at 2,530 permanent exhibitions and organized 5,392 temporary exhibitions (including 165 exhibitions from abroad). The number of guests visiting Polish museums is systematically increasing. In the audited period, it was 36.1 million people (8.4% more than at the end of 2015). As part of the statistics of visitors, it is significant that 13.7 million people visited museums free of charge, 15.5% of all visitors were organized groups of schoolchildren. As part of...
the popularizing and educational activities in 2016, museums organized 156.1 thousand events attended by 8.3 million people. (GUS, 2017, pp. 94-95). At the end of 2016, the population of Poland numbered 38.4 433 million people, which means that statistically a Polish resident participated in less than one cultural event in museum per year. However, this does not mean that every Pole participated in at least one cultural event in a year.

On the various protection of monuments and care over monuments and the activities of institutions actively supporting this activity, in 2016, PLN 267.5 million was spent from the state budget (including transfers to local government units) (PLN 283.8 million in 2015). Which constituted 10.3% of state budget expenditure on culture and protection of national heritage (14.4% in the previous year). In addition, the total expenditure of budgets of local government units for the protection of monuments amounted to PLN 255,9 million (in 2015 – PLN 257,9 million) (CSO, 2017, p. 69).

In Poland, the most important revenue of the museum is the subsidy obtained from the main organizer, it accounts for nearly two-thirds of the budget value. The second most important source of income, on average over 7%, is the so-called own activity of the entity, means independent measures developed by institutions, including sale of tickets, sale of educational and promotional offer, sale of services (including conservation services), sale of rights and licenses to resources, sale of publications and museum products, among others photography, digital resources; specialist consultations, rental of premises, transport and other (including some type of business conducted by 67% of Polish museums), (Murzyn-Kupisz, 2016, p. 93).

In the economics of culture and Polish realities, both the management of culture and economists are alarming that the system of financing culture does not allow for the efficient functioning of cultural institutions. Financing culture, even taking into account and reconciliation with the cost disease, is so insufficient that it is difficult to develop any rational assumptions for research. According to the authors, but also the informal opinion of many managers of cultural institutions, selected measures to assess the financial standing of museums are not a true reflection of the state of the institution, nor the quality of its functioning, nor the financial situation.

Museums are depositaries of material and non-material cultural heritage. As such, they should be assessed with properly selected measures. Such indicators should reflect their potential. In spite of which in the long term, they could become the base for economic prediction. This prompted the authors to reflect on the possibility of developing better indicators (measures) adequately reflecting the life and problems of the institution in economical background. Towse (2011, p. 197) describes experimentally the example of public investment in the construction of a new museum.

For the estimated data, she proposes well known formula:

$$NPV = \sum_{t=0}^{n} \frac{C_t}{(1-r)^t} - \sum_{t=0}^{n} \frac{R_t}{(1+r)^t}$$

where the sum of NPV components is the net present value; t - discounting period, e.g.: annual (in the case of building a museum, costs appear immediately, and revenues only after completion of the investment); n - project planning period; C - project costs; r - is the discount rate that equates the stream of future costs and revenues (the value of r must be ≥ 5, because only then we can talk about profitability, if r is higher than the value of borrowing capital on the market); R - revenues from the project, which at the investment stage are 0, only after its completion will take a positive value. Of course, another difficulty is the incompatibility of the non-economic approach, with the principle that the economic effects are marginal. For the above example, the completion of the project is the completion of the investment. In this approach, it is reasonable to only talk about costs. The evaluation of the functioning of the new museum could be, for example, in the next 20 years,
another project. However in the public opinion these are only stages of the same venture and only this can be assessed from the point of view of the effectiveness of cultural policy (Towse, 2011, p. 213).

For the authors inspiration in further research comes from evolutionary economics. The permanent change, which purpose and cause of is to strive for better adaptation to life in the environment. In metaphysical terms, such a change as development brings about a model with the regularity of the snail shell. The value of accumulated heritage systematically increases, increases in time, in a manner appropriate to the graphical presentation of the sequence, the words of which form square roots of Fibonacci numbers (Fig. 1). Of course, each institution, each newly created museum, starts with minimal capital – a specific founding fund and the individual potential of the founder.

Figure 1: Logarithmic spiral of the Fibonacci sequence  
Source: own elaboration

For the new institution, much will depend on this potential, creativity and the environment and the ability to cope with competition on the market. Hence, the value of the first word is not equal to 0, only the element of $\phi$, while the subsequent quotients of words will always be square roots of consecutive Fibonacci numbers (these are always consecutive primes). Systematically growing two rectangular right-angled triangles are: a – material heritage – a smaller value, easier to measure and b – non-material heritage – a greater, more discretionary value, an element from the next to the first number. The hypotenuse, c – the next first number after b, would be the equivalent of the actual value sought, combining the interrelated values of a and b. The values of subsequent Fibonacci numbers aim for the value = 1.2720, which seems to be an interesting value in the context of the above described Towse experiment. Recalling that for NPVs the value of NPV was to be higher than 0. Assuming, that museum institutions do not have a chance to be viable in economic terms, perhaps the 1.2720 value is the minimum, optimal and maximum result – why further calculations are worth it. The hypotenuse value mathematically associated with the beginning of the construction of the next segment, as well as with its end.

Another interesting reflection could be the value of the field of the obtained triangle (from the classic Pythagorean Theorem), understood as the value of the potential of a given cultural institution. Figure 2 presents the graphical representation of the Fibonacci sequence with triangles which also could be described with the mathematical formula and the drawing below.
This graphical representation of the Fibonacci sequence can be expressed by the following formula:

$$\lim_{n \to \infty} \frac{\sqrt{F_{n+2}}}{\sqrt{F_{n+1}}} = \sqrt{\varphi}$$

This authors hypothesis is just the first step to the further research project and should be developed. The evolutionary theory is not anymore the mainstream theory in the contemporary natural science. However implementation of the basic thesis to the economy of culture might give the very interesting result. According to the presented data to describe the life of the active museum and the cultural participation the big number are used. From the sociological and political reason such solution is understandable.

**CONCLUSIONS**

In this paper authors shows the indicators which are used by the museum to describe their statutory activity. This indicators are known and measure in every museum and give the basic information which is comparable, looks good with the big numbers and surely is a good tool to conduct the cultural policy. With such indicators clear is that they affect the imagination of the decision-makers, politics and cultural managers. If the cultural heritage (material and non-material) is valuable, even though it cannot be measure, the further research could apply to create and develop more adequate measurement tools and indicators reflecting the actual economic situation. Such fact makes reasonable further calculations on real data. Authors conclusion is that the new indicators are needed and the proposed formulas might be helpful in testing the new solutions. Museums are actively adapting to the dynamic reality of the 21st century. Tasks, or rather challenges, faced by a modern museum, is to find the balance between two equally important spheres of value: artistic and economic. These activities are aimed at systemically strengthening strategic management and quality management in museum, and this guarantees the survival and development of every organization in a dynamic way the changing reality (Lewandowski M., 2011, p. 28, Matt G., 2006, p. 56). Museums of the 21st century are in the revolution. In order to ensure their survival and development, it is necessary to make properly diagnose of situation and select measurement tools that will be able to describe their real condition. Furthermore that helps to predict possibility of institutional development. And finally, what is the most important better prevent the heritage of humanity.
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20. Wewnętrzne akty normatywne i dokumenty sprawozdawcze wybranej instytucji kultury: Zarządzenia i Sprawozdania Muzeum Narodowego w Szczecinie (udostępnione na potrzeby opracowania w dniach 10-24 sierpnia 2018 r)
An Empirical Assessment of the Romanian Business Management Software Market: Looking through the Lens of the Developers

Mihai Ilie BALABAN
“Lucian Blaga” Univesity of Sibiu & Unimat company, Sibiu, Romania
info@mihailabalaban.ro

Danuț Dumitru DUMITRAȘCU
“Lucian Blaga” University of Sibiu, Sibiu, Romania
dan.dumitrascu@ulbsibiu.ro

ABSTRACT
The aim of this paper is to provide the interested public with an updated empirical evidence of the Romanian integrated software market designed for business management. Based on a hybrid methodological approach, our attempt is to offer in-depth answers, when the actual integrated enterprise management is called into question. Data were collected from software developers and integrated solutions vendors located in Romanian (N=11), who have previously provided and implemented ERP / CRM / BI integrated solutions and packages, both in Romania and abroad. The main research findings are oriented both towards the profile and receptivity versus reticence of those companies interested in acquiring and implementing integrated solutions, and to the recommendations proposed by the vendors for the business and academic users.

Keywords: business management, integrated software solutions, academia, Romania.

INTRODUCTION
In recent years, there has been an increasing global concern in integrating information within organizations, coming both from scholars and business stakeholders. It appears from substantial researches run in the field (Somers, Nelson & Karimi, 2003); (Schlichter & Kraemmergaard, 2010); (Young, 2007); (Sanchez & Perez Bernal, 2007); that numerous investigations have been conducted on emphasizing the complex capacities and functionalities of diverse enterprise systems. These may vary from exploring their capacity of integration (Sanchez & Perez Bernal, 2007); (Esteves & Pastor, 2001); their capacity of absorption (Zahra & George, 2002), their innovative features (Kanallou & Spathis, 2013), the users’ profile (Holsapple et al, 2005), the team attributes (Bradford, 2003), to the environmental and infrastructure particularities (Frejik et al, 2015).

However, little attempt was made to investigate these idiosyncrasies at empirical and practical level, among organizations dealing with business information management systems in Romania (Moisuc & Stelianic, 2010); (Balaban, Dadarlat & Dumitrașcu, 2014); (Fotache & Hurbean 2004). In Romania, there is still the evidence that many companies are self-reliant to island-type applications, most of the companies being reticent towards integrating all information into a unique comprehensive system. But, where best practices occur, with organizations that are at incipient or developing phase of implementing business management packages, analytic measurements were performed, as part of a larger project we run in Romania. From the wide range of traditional software packages, for the present paper, the following three applications were targeted: Enterprise Resource Planning – ERP, Customer Relationship Management – CRM, and Business Intelligence - BI.
Aim of the study
Therefore, the aim of the present paper is to investigate, by means of a hybrid methodology, the status of actual integrated systems for business management, from the prospective of its producers, activating on the Romanian environment.
During the qualitative and quantitative analytical path, increased attention is paid to recording and interpreting the collected data, having as main operational objectives the analysis of the following structures and concepts: a) the profile of Romanian integrated software market; b) the receptivity of Romanian companies towards implementing integrative solutions; c) the reticence of Romanian companies towards implementing integrative solutions; d) the recommendations of software solutions producers for business environment; e) the recommendations of software solutions providers for academia.

Research questions
Therefore, in accordance with our aims, the following research questions arise:

Research question 1: Who are the users/buyers of business integrated solutions?
Research question 2: What are the main motivations of adopting versus refusing the implementation of integrated solutions needed for decision making management?
Research question 3: What are the recommendations made by business management producers for the business users of ERP/CRM/BI software solutions and for Romanian academic curricula and the educational improvement?

Instruments and procedure
The structure of the semi-structured interview applied to ERP / CRM / BI software developers, comprised open and closed-ended questions, designed to capture the who, the how and the why, related to first hand data on business management solutions in Romania. Thus, the research apparatus was based on open-ended questions, aimed to depict a more rigorous understanding on: the portrait of the buyers of business management solutions, as it appears from the close angle of its developers, the openness versus the reticence in adopting ERP/CRM/BI software solutions on behalf of Romanian companies, and on the recommendations provided by the producers for the business and academia target environment, respectively. The qualitative methodology was selected, as it was considered to be the most appropriate in order to allow the collection of much more detailed information and in-depth narratives, which may lead to the confirmation or rejection of the data obtained when using quantitative research methods.
Participants were selected following two-fold selection criteria: 1) to belong to the community of software vendors; 2) to have previously implemented ERP / CRM / BI integrated solutions and packages. Moreover, the developers were asked to offer socio-demographic data related either to themselves or to the representative company.

Sampling
Data were collected from software developers and integrated solutions providers located in Romania (N=11). The composition of the sample was the as follows: mostly men (90,9%), between 35 - 38 years old (54,6%), mainly administrators (45,5%) and project managers (45%), being either engineers (54,4%), consultants, economists, or programmers (9,1%), within organizations located around different towns in Central (45,5%), South (45,5%) or Northern - Central Romania (45,5%). Most of the interviewed organizations were founded before the year 2000 (50%), while 20% of them were established just after Romania's accession to the European Community. From these companies, 45,5% have national capital, while 27,3% have mixt capital. In accordance with the number of employees, the most prevalent companies were both companies of small dimension (1-10 employees) as well as of big dimension (251-1000 employees) (36,4%).
An empirical assessment of the Romanian business management software market: looking through the lens of the developers Mihai Ilie BALABAN, Danuț Dumitru DUMITRĂȘCU.
Research question 1: Who are the users/buyers of business integrated solutions?

From the analysis of the quantitative data, it is revealed that the buyers of integrated solutions for decisional management are mainly companies with mixed capital (71.4%), followed by those organizations with Romanian and foreign capital (14.3%), interested in the acquisition of integrated ERP packages (66.7%), while BI and PM solutions are purchased only by 16.6% of foreign companies operating in Romania. (See table 1.3). Other packages demanded and mentioned by the participants make reference to the broad software suite designed for company management or to CRM, SAP, WHM packages.

<table>
<thead>
<tr>
<th>Table 1.3: Sample distribution following the number of employees and the type of software provided</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of employee per client organization</td>
</tr>
<tr>
<td>---------------------------------------------</td>
</tr>
<tr>
<td>Number of employee per client organization</td>
</tr>
<tr>
<td>1-10</td>
</tr>
<tr>
<td>101-250</td>
</tr>
<tr>
<td>251-1000</td>
</tr>
<tr>
<td>Total</td>
</tr>
</tbody>
</table>

A common view amongst interviewees was that the buying phenomenon is not a steady one, per se, but it depends on several distinctive factors. Thus, in our case, the buyer's typology is structured according to the following coordinates: the type of capital (Romanian, mixed or foreign); the size of the company; the support provided by the top management; the cost and the funding potential; the corporate vision, the change management criteria, and the expectations for delivered product.

Below there are reproduced some of the field narratives recorded from the producers:

"The companies that are interested in acquiring an ERP and CRM system from the local market are generally those whose capital is predominantly Romanian, while BI solutions are designed mainly for foreign companies that have the income structure in Romania, not just being the cost centers of international companies ". (Administrator, 35 years old, Bucharest)

"In the vast majority of cases, the expectations are located within the price / quality area. Romania still is a price-sensitive market, following the perception that the beneficiaries look for solutions that will solve all their problems within the organization with an extremely low price. There are often situations where the boundaries between solutions and their specificity are not quite well understood, so that beneficiaries expect that there is a singular solution created to solve the existent problems in all the activity areas of their organization (e.g. a CRM system including calculation capabilities stocks, etc.)"(Key account, 32 years, Bucharest)

Some participants expressed their conviction that most of the enterprises that acquire software solutions for a better management decision are "companies that have reached an average level of complexity in their sales / acquisition / production and logistics processes and target a) to have a clear overview and b) to successfully manage the key points" (Administrator, 38 years old, Sibiu)

In response to the question: "What are the most requested modules by your customers?", a range of responses was elicited. Most of these answers were oriented to the financial-accounting modules, followed by the module necessary for accounting departments, logistics, sales and production department, human resources, whereas the modules planned for quality control, research-
development, IT-management or legal were less demanded. From the analysis of the narrative fragments recorded from the participants at our study, it appears that the radiography of the producers’ market of the integrative software solutions is a transitional one, which follows a predominantly emerging trajectory. A recurrent theme in the interviews was a sense amongst interviewees that this market is mostly understood in positive terms at the moment. In this direction, some participants expressed their beliefs that the Romanian market even an emerging one, is defined mainly as a market driven by: a) the deficit of education and training, b) the European funding, c) the most convenient cost, d) the lack of clear vision and e) the choice for general solutions without any support for particular needs.

Research question 2: What are the main motivations of adopting versus refusing the implementation of integrated solutions needed for decision making management?

When the participants were asked about Romanian companies’ perception on the implementation of integrated packages and solutions, the majority offered various answers. In fact, our experimental set up bears a close resemblance to motivations frequently mentioned in previous literature (Al-Mashari & Zairi, 2000); (Somers & Nelson, 2001); (Moon, 2007), (Esteves & Pastor, 2001). Thus, following the opinion of the developers of business management systems, the most frequent measurable dimensions of the responsiveness in the implementation of integrated software, refer to two major aspects:

a) Generating organizational performance through dissemination or informational flow

"Generally, most of the discussions are running with representatives of Romanian companies for CRM and ERP, because they aim a better internal organization. The implementation of an integrated ERP / CRM / BI system allows the flow of operations, which vary from prospecting clients to bidding, contracting, compiling all the documents that appear on the flux. In most case the companies are found in different stages of ERP / CRM and BI systems implementation, so they encounter problems in integrating all company processes into the software "(Administrator, 35, Bucharest)

b) Functionality and benefits in terms of ROI

Moreover, from the descriptive analysis we observe that the motivational hierarchy of such solutions implementation is determined mostly by the need of integrating the information into the database. This is followed, in order of their priority, by the interest in achieving performance indicators, the interest in the managerial and operational processes and, last but not least, the interest in optimizing the customer relationship. In this respect, table1.4 is relevant for positioning mean scores and standard deviations, following their rate of significance.

| Table 1.4: The motivations of implementing ERP, CRM, BI (means per dimensional category) |
|---------------------------------|-------|-------|-------|-------|-------|
| customer relationship          | 3,98  | 3,25  | 4,50  | 1,25  | .53   |
| integrating information into databases | 4,13  | 3,00  | 5,00  | 2,00  | .65   |
| KPIs                           | 4,07  | 3,00  | 4,86  | 1,86  | .64   |
| management, communication and operationalization | 4,09  | 3,17  | 4,83  | 1,67  | .45   |

Interestingly, there were also differences in the ratios of reluctant assessments in integrating soft solutions, on behalf the client companies. In this regard, the reticence mapping is mainly centred around answers reporting causes related to: the insufficient knowledge of the benefits of such packages; the lack of top management support; the lack of pre-implementation consultancy, or the high costs of acquisition and implementation.
Further data examinations showed relevant information when reporting the inhibiting factors before or during any implementation of integrated decision management solutions. Remarkably, when trying to emphasize why companies refuse to adopt an ERP / CRM software, the most answers lead us to highlight the following constraining criteria:

i. Organizational culture features;
ii. The competence of the project management team;
iii. Pre-consultancy and pre-training;
iv. High costs;
v. The lack of technical support and prior consultation;
vi. Reticent behaviour due to process incomprehensibility;
vii. Costs and lack of sustainability of change and project management.

Research question 3: *What are the recommendations made by business management producers for the business users of ERP/CRM/BI software solutions and for Romanian academic curricula and the educational improvement?*

Our findings appear to be well substantiated when comes to the suggestions made by vendors both for final users and for academia.

On one side, there is an agreement between most of the interviewees, pointing to a picture where most the proposals for existing and future users interested in implementing ERP/CRM/BI software solutions in their organization, make reference to the repetitive aspects, stated below:

i. Analysis of business flows
ii. The role of the implementation team
iii. Time and cost resources
iv. Establishing partners as well as support from top management.

Among the recommendations, we reproduce a relevant provided by one of the interviewed software developers, which states that it is of a great importance for each company

"to define its requirements at a certain point in time; to adopt a single system covering multiple domains (HR, finance, project management, supply chain, fleet management, asset management etc.). An unique system gives the advantage that the data do not have to be synchronized between different systems, which means low costs and less time consuming, but in the meantime, it has the disadvantage of being dependent on only one supplier."

(Project manager, 44 years old, Bucharest)

Moreover, "although the time of implementation and the investment to acquire an ERP / CRM / BI integrated system are considerable, but on medium and long term it means a stronger and more stable company at the flow level, with available information, process validation, better prepared human resource, better production process, faster service and offer and in time more automatized procedures.” (Administrator, 35 years old, Bucharest)

On the other side, Custom-made software solutions provided several proposals for the academic staff and university students, which touch the following advancements:

i. Introducing e-learning platforms
ii. Updating educational curricula and focusing more on practice
iii. Updating current needs to the enterprises’ needs.

"Many times, in the case of implementations, we found that beneficiaries, some even with full-time higher education graduation, have difficulty in understanding the utility or the way of implementing software solutions. There is a big difference between conceptual understanding in school and applying them into the reality. Programmers generally have poor technical training and some concepts that bind very well at a technical level may have no logic in the real application of concepts. The school presents liked financial concepts, while in reality companies are pursuing them multi-dimensionally, meaning the same information but from different perspectives. The software does not solve all the company's problems, but only provides employees with the means to record information about current business, as well as certain business flows. Solutions and
decisions are typically taken by employees, regardless their hierarchical function, while the software provides only decision support. The examples used in the academic environment should have a high degree of complexity and applicability in the real world, in order to fully describe the process or flow to which they refer to (Administrator, 35 years old, Bucharest)

Another recommendation focuses on "preparing students for a modern business environment with really modern tools. All vendors are willing to help the academics in this respect "(Project manager, 42 years old, Bucharest).

INSTEAD OF CONCLUSIONS

Our empiric investigations so far, have only been on a small scale applied to Romanian integrated software ventures, given the restraint sample willing to take part into the present study. On account of the fact that, this was only a preliminary attempt to investigate the state of the Romanian integrated solutions’ provider market, it is once again confirmed that todays ‘competitive organisations need to put together users, providers and academics.

Despite the fact that this research might have given rise to many questions in need of further investigation, it remains an tool for investors, future and actual users of integrated software solutions; as well as an useful guide for vendors willing to adjust their products according to the requirements of the current market.

In a nutshell, the main findings of our paper point to a brief picture where the Romanian companies interested in the acquisition of integrated solutions for decisional management are mainly mature companies with joint capital, oriented for financial-accounting modules, logistics, sales and production. What strikes us, was the recurrence of the narratives related to the perception that the integrated software solution market is driven by a strong deficit in education and training, generated due to the European funding and the most convenient cost, along with the lack of clear vision and choice for general solutions without any support for particular needs.

The developers’ major motivations in implementing such solutions are oriented towards generating organizational performance through dissemination or informational flow, along with the functionality and benefits in terms of ROI. The vast majority of the respondents argue that they are requested to implements decisional management tools in order to facilitate better customer relationship, to integrate information into a singular database, for the KPIs, as well as for better internal management, communication and operationalization. On contrary, the vendors point out the major motivations for not implementing integrated solutions, which are mainly related to the insufficient knowledge of the benefits of such packages; the lack of top management support; the lack of pre-implementation consultancy, or the high costs of acquisition and implementation.

The developers made recommendations both for the business users of ERP/ CRM /BI software solutions and for Romanian academic curricula and the educational improvement

On one side, the recommendations made by business management producers for the business users of ERP/ CRM /BI software solutions make reference mainly to the following aspects: the analysis of business flows; the role of the implementation team; the time and cost resources; the establishment between partners, as well as the needed support from top management.

One the other side, the recommendations made by business management producers’ better academic curricula configuration and the educational improvement, are related to the following imperatives: introducing e-learning platforms, updating educational curricula and focusing more on practice and practical adjustments to current need of todays’ competitive the enterprises.

Or work has highlighted its practical utility for producers / suppliers of integrated solutions in from public, private and non-profit organizations in Romania, which may be replicated in other cultural business environments. Accessing and implementing outstanding ERP/ CRM/ BI software, through collaboration with suppliers must be a desideratum of both academic and business institutions, in order to facilitate the practical access of students to valuable and highly demanding business "tools" and to meet the ends for an efficient and predictable decisional corporate management and business performance.
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