INNOVATIVE TOOLS FOR FACILITATED TRANSFER OF ENTREPRENEURIAL SKILLS AND KNOWLEDGE

Wydawnictwo Uniwersytetu Gdańskiego

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editors
Wojciech Bizon
Andrzej Poszewiecki

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Reviewer
Jerzy Cieślik

Cover and title pages design
Filip Sendal

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Michał Janczewski

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Wydawnictwo Uniwersytetu Gdańskiego
ul. Armii Krajowej 119/121, 81-824 Sopot
tel./fax 58 523 11 37, tel. 725 991 206
wyd.ug.gda.pl, kiw.ug.edu.pl

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Introduction

Laying foundations for the development of entrepreneurial attitude is a complex process, involving not only the transfer of the necessary knowledge and acquisition of skills required for running a business but also implanting confidence in oneself and one's potential. Currently, a lot of attention is being paid to raising awareness, especially in young people only entering the labour market, of the fact that getting on a career path implies constant readiness to adapt, learn and handle obstacles.

Almost since the beginning of the political transformation, the Polish system of education has been enriched with programmes intended for providing knowledge on the economy and developing in young people qualities considered as 'entrepreneurial' such as mettle, self-reliance, ability to make one's own decisions and a sense of responsibility. These activities are based on a conviction that entrepreneurship can be taught in the same way as the basics of mathematics, biology or a foreign language.

Nothing could be further from the truth.

Recent years have shown that youngsters do not embrace the role of an employee in the labour market. A vicious circle myth: "there are no jobs for the inexperienced, and how to gain experience if there are no jobs" is not the only reason. There are also considerable discrepancies between what employers expect and what today's graduates of higher education facilities and those of secondary schools can offer. The high unemployment rates among graduates of high education facilities reported recently and unheard of before question the quality of academic education as regards preparing future graduates to commence professional work. At the same time, the figures indicate that a better integration of formal education with actual challenges that entrepreneurs will expect new employees to take on is a potential solution to the problem of structural unemployment among the young graduates. To attain this goal, ever new forms of teaching are applied, developing students' own business initiatives among others, designed so as to equip graduates with the qualities the latter will find indispensible for embracing their place in the labour market.

In the world of fairly unlimited access to the knowledge resources accumulated over years, it is the ability to select information, to combine many aspects of the latter appropriately and to embody ideas efficiently that becomes the most crucial skill. In the light of the revolution connected with access to knowledge, speed and quality of communication and data transfer, it appears certain

that, in order to be effective, the forms of training currently applied should combine modern technologies, which have been immanent in young people's everyday lives, with practical issues, i.e. actual problems arising in the reality in which the future graduate will operate in a few years' time. Case analyses (studies), a didactic tool that has been facilitating the teaching process for a long time now, may answer this need. Once the students have somewhat improved their 'input' skills within the realm of communication technology, their work can be supported by Internet-based business games and simulations accessible from anywhere.

In order to meet the demands of today's economy, in 2011–2013 the University of Gdansk implemented an innovative pilot project Case Simulator[1]. The project combines the latest methods of developing entrepreneurial mindsets among university students: business simulations and case studies.

The present report discusses the issues of the effectiveness of innovative didactic tools which are used in teaching entrepreneurship and in developing entrepreneurial mindsets. The elaboration resulted from the collaboration of a team of authors from the University of Gdansk, who either implemented the Case Simulator project at its various stages or have a long experience of successful application of other non-standard forms of knowledge and skills transfer.

The authors' goal was to show that there is a real demand for modern forms of teaching and present a selection of methods, but most of all to prove, based on the research carried out, that carefully planned teaching merging case study analyses with an online business simulation constitutes a very effective tool for teaching entrepreneurship.

The opening chapter by Andrzej Poszewiecki discusses the role of entrepreneurship in the economy and in education systems. It also presents the situation of higher education facilities' graduates on the labour market.

In chapter two, Andrzej Poszewiecki classifies and discusses traditional and new methods of developing entrepreneurship and those of teaching it.

The case study method and its role in today's modern education have been elaborated on in chapter three. Its authors Magdalena Markiewicz and Joanna Bednarz exemplify the significance of the case study method in creating entrepreneurial attitudes in students. Pointing that this method is applied in teaching at world's top higher business education facilities (Harvard Business School, Cambridge University and IESE Business School among others) the authors prove that case studies enable students to develop numerous hard and soft skills. Moreover, referring to the SWOT matrix, they present the most important features of the case study method as identified by its users. At the same time,

[1] The *Case Simulator* project was part-financed by the European Social Fund within the Framework of the Human Capital Operational Programme. Coordinating partners: The Faculty of Economics, University of Gdańsk (leader), Regional Pomeranian Chamber of Commerce (national partner – employers association), Hochschule für Technik und Wirtschaft Dresden (transnational partner). Time framework: 01/09/2011 – 15/12/2013. Implementing Institution: Voivodeship Labour Office in Gdansk. Subsidy Contract No.: POKL.06.01.01-22-166/10-01.

they indicate a clearly visible gap in Polish education with respect to the active shaping of entrepreneurship in higher education facilities and secondary schools, and offer solutions to mitigate the consequences of this deficiency.

Chapter four is about the use of business simulations, the second pillar that the Case Simulator project rests on. Describing the roots of simulations and their typical areas of application Marcin Skurczynski focused on presenting various types of simulations and matching them with particular forms of education. The chapter concludes with an overview of the Polish market of business simulations, a description of the extent to which they are used by Polish higher education facilities and a brief presentation of the most popular tools.

More information on different aspects of business simulations is to be found in chapter five, which pertains to designing realistic teaching environments that engage students and increase their satisfaction from developing competences. Michal Kuciapski proves that requirements so defined match simulations perfectly well in that the focus of the latter is on the transferability of the knowledge acquired in laboratory conditions onto real life problem situations. Based on the Case Simulator simulations, key solutions to consider in business simulations were defined along with an assessment of their significance for designing and developing new simulation tools.

The designing of forms for reliable evaluation of the level of entrepreneurial qualities is what Przemyslaw Kulawczuk discusses in chapter six, laying out the European (Entrepreneurial) Skills Achievement Contest assumptions and analysing data collected from students across different European countries.

Chapter seven aims to introduce the reader into the nature of the Case Simulator project. Bringing forward the problems of today's labour market, Wojciech Bizon, who was in charge of the project, proves the rationality of implementing programmes similar to Case Simulator. Referring to results of numerous studies, including those carried out in connection with the project, the author sets each stage of the project work against the vital background of issues yet to be solved. He arrives at a conclusion that the teaching of what is known as managerial skills – ability to generate ideas, to respond to changes in a flexible manner and to identify opportunities and threats – along with self-confidence building will have impact on developing entrepreneurial mindsets in young people and encourage them to start up business activity. This in turn is a starting point for improving their position on the labour market, which contributes to a more proactive approach to shaping their own business activity.

Chapter eight is an account of the assessment of preliminary level entrepreneurial skills in students. Starting from the results of the European (Entrepreneurial) Skills Achievement Contest, the author Andrzej Poszewiecki applies advanced statistical methods (e.g. ANOVA, cluster analysis) to perform multifaceted comparisons. The presentation of findings have been supplemented with clear charts and diagrams. The analysis performed has not indicated a statistically significant impact of sex on entrepreneurial skills. Statistically

important discrepancies have been spotted in regard to entrepreneurial skills across different faculties. In the second part of the chapter, the authors Wojciech Bizon and Paulina Szulc-Fischer analyse the expectations that students express in terms of a place of work, working conditions, most desired features in entrepreneurs as well as the perception of persons running their own business activity among representatives of other professions. The authors also study factors favourable to launching one's own business activity as well as those discouraging from it. All this to perform a final analysis, through developing and applying reliable and cogent measuring scales, of the students' self-perception of the level of skills and knowledge fostering business activity. It has been observed, for instance, that students assign a clearly higher value to their personal skills important for running a business (e.g. courage, communication skills) than to the hard knowledge of issues such as procedures of setting up a firm or ways of acquiring funds.

Chapter nine makes the reader familiar with the ways of measuring the effectiveness of teaching based on modern forms of knowledge transfer. Its author Wojciech Bizon describes a pattern of activities leading to answering the question of how to do it properly and reliably, applying well-approved methods culled from advanced statistics.

A study of students' entrepreneurial knowledge as well as of the basis for the functioning of an enterprise and of the economy constitutes the contents of chapter ten, which offers yet another argument in favour of high efficiency of innovative knowledge transfer. The author Wojciech Bizon proves that: "as regards the knowledge area that is critical for the goals defined within the Case Simulator, i.e. practical aspects of business and entrepreneurship, in both the business and non-business student groups there is a very clear difference between those who applied the case study analyses and the business simulation and those who did not participate in the classes. Set against the indices adopted *a priori* this observation leads to a conclusion that the difference reported proves the application of the Case Simulator toolbox of activities a success. In this context, the results obtained can be considered a success of the project measures." Another step towards verifying the effectiveness of knowledge transfer was comparing the changes (enhancement) in knowledge and skills among the project beneficiaries, i.e. class participants. The most crucial observation is a fact that: "in the main knowledge area related to the objectives of the Case Simulator project, i.e. practical aspects of entrepreneurship, it is the dynamics of change that was the greatest. The reported level of growth neared 55%, which is almost 5 points more that the level originally planned before the launch of the project. Additionally, the knowledge enhancement ratio reported in the female group – a potentially disadvantaged group in terms of the general perception of its members' business knowledge – was almost 64%," which made it possible to attain the ratios assumed in the project.

We hope that the present publication will come as an aid to all those who are looking for innovative and effective solutions within the realm of shaping entre-

preneurial mindsets. The Case Simulator project formula remains open, and the solutions developed will be systematically incorporated into academic curricula at the University of Gdansk, both for business and non-business disciplines. The tools and products that we developed over the two-year period will also be available. We wish others benefited from them, which we warmly welcome.

Wojciech Bizon
Andrzej Poszewiecki

Chapter 1

Challenges of today's markets. Developing entrepreneurial skills in students

Students and graduates on labour market

Current situation of the labour market has been subject to a number of analyses. Most of them indicate very serious problems and consider new solutions to this situation. Labour markets have been undergoing considerable fluctuations. Questions arise about the best career model, best ways to seek opportunities as well as most useful qualifications and skills. Also the financial crisis which began in 2007 and still has a significant impact on the functioning of European economies contributed greatly to growing uncertainty around the labour market.

The financial crisis which started in 2007 quickly spread from the bank sector onto the entire economy. It is mostly the increase in unemployment that is its calculable and result. The media shock with information on a difficult situation of young people on the labour market. The table below reflects unemployment rate changes among those entering the labour market.

The table contains data from selected EU member states plus Norway, the USA as well as average values for the whole EU. The data concern January 2007 and December 2012. This juxtaposition makes it possible to compare the employment rate before the crisis with the most current data available. The column „change in U25 group" shows a percentage change in unemployment in the age group under analysis. Additionally, in order to make it possible to assess to what extent the changes among young people are characteristic to this age group only, the last column shows data on the general unemployment rate. Only in four cases (Greece, Malta, Portugal, USA) unemployment among graduates has changed more favourably than that on the general level. Malta scores highest against this background, with the unemployment rate among persons aged under 25 having dropped by over 22% compared to the general unemployment rate decrease of no more than 7%. Also Germany defies the general trend, were unemployment both among the youngest and among labour force in total

dropped considerably. However, some negative signals can be identified there that might indicate a possibility of labour market deterioration. It is enough to have a look at the value of both PMI indices (*Payment Morality Index* – assessing an economic situation on the basis of consumer behaviours (debt value, delays in payments due) and *Purchasing Managers' Index* – concerning new orders, inventories, production volumes, employment and prices). The value, currently below 50, may mean that the German economy may have to face recession too[1].

Table 1. Unemployment rates among persons aged under 25 in 2007 and 2012

	2007M01	**2012M12**	**Change in U25 group (%)**	**General change (%)**
Austria	8.3	10.2	22.89	6.82
Denmark	7.0	14.3	104.29	89.74
Finland	17.5	19.7	12.57	6.94
France	20.3	26.3	29.56	19.32
Greece	18.0	52.7	192.78	203.45
Spain	13.8	56.3	307.97	218.29
Netherlands	6.3	9.9	57.14	45.00
Ireland	9.2	36.2	293.48	226.67
Lithuania	6.8	27.4	302.94	224.39
Malta	19.5	15.2	-22.05	-6.85
Germany	13.3	8.9	-33.08	-43.01
Poland	23.1	25.1	8.66	-7.96
Portugal	20.2	36.5	80.69	88.04
Slovenia	9.0	29.9	232.22	85.19
Sweden	18.7	24.2	29.41	21.21
Hungary	17.3	27.6	59.54	56.34
Italy	17.7	35.0	97.74	82.26
Norway	8.3	10.9	31.33	29.63
USA	10.8	16.7	54.63	69.57
EU (27 states)	15.9	23.9	50.31	40.79

Source: Own elaboration based on Eurostat data.

According to some, one of the reasons for a high unemployment rate among young people is too big a supply of employees who graduated universities, which makes it impossible for them to find a job matching their ambitions. Indeed, recent years in many countries, including Poland, saw a significant increase in the number of university students. The table below presents scholarization rates in selected OECD countries.

[1] http://www.markiteconomics.com/MarkitFiles/Pages/ViewPressRelease.aspx?ID=10862 [access: 21.03.2013].

Table 2. Academic level scholarization rate in selected OECD countries

Country	Scholarization rate 2010	Scholarization rate 2011
Iceland	60	60
Poland	55	58
UK	51	55
Denmark	50	50
Australia	50	50
Slovakia	49	46
Finland	49	47
New Zealand	47	52
Ireland	47	43
Netherlands	42	42
Norway	42	43
Japan	40	44
Portugal	40	39
OECD average	39	39
USA	38	39
Spain	37	32
Germany	30	31

Source: Own elaboration based on *Education at a glance 2012: OECD Indicators*, OECD Publishing 2012, pp. 60–69 and *Education at a glance 2013: Highlights*, OECD Publishing 2013, p. 27.

According to OECD studies, the scholarization rate in OECD countries in the last 15 years has increased by 20 percentage points on average. A record increase, based on the same sources, was reported in Slovakia (a 47 percentage points increase), Iceland (an increased by 40 percentage points), Poland and Portugal.

Germany is characterised by a low value of the scholarization rate at the university level, which, however, does not support the thesis that the countries with a low value of this index are characterised by low unemployment. It is enough to look at Spain as a perfect counterexample. The university students to total population of their peers ratio in this country is also lower than the OECD average, but the unemployment rate has reached a record value in Europe, amounting to 56.3% among the population under 25 years of age. Obviously, oversimplified as it is, this kind of analysis cannot offer clear-cut conclusions.

In its report, OECD came to the conclusion that university level education in the analysed countries, creating opportunities for higher remuneration, acts as an important incentive to make an effort to study at this level and obtain higher qualifications. Data prove that employees with academic education in OECD states earn on average 55% more than those with secondary school education. In Poland, Brazil, the Czech Republic, France, Germany, Hungary, Ireland, Israel, Slovakia and the United States a man with a university diploma earns at least 80% more that a man who graduated college only[2].

[2] *Education at a glance 2012: OECD Indicators*, OECD Publishing 2012, pp. 140–150.

However, as indicated above, common accessibility to academic education may eventually lead to a big supply, which in turn will lead to a drop in employability and decrease in salaries, at least those of some university graduates.

It is implied in the situation described above that it is necessary to undertake activities oriented at developing entrepreneurship and encouraging students to structure their career path development towards the "working for myself" rather than "working for somebody" mode. Of course, one has to realise that not everybody wants to or can make an entrepreneur. However, developing skills in this domain is becoming an important role of higher education facilities. The more so that, as shown in research conducted on white citizens population in the USA[3], among other countries, there is practically no correlation between the level of education and willingness to set up one's own business activity[4]. The same research showed that social exclusion and difficulties in finding employment are factors that spark up entrepreneurial potential and motivate to make a decision about establishing one's own business.

Studies conducted in Germany on the other hand, have not proved an increased eagerness to set up new companies in the regions with higher share of inhabitants with higher education level[5]. There is, however, strong positive correlation between the share of those with secondary level education among the employed and the number of newly set up businesses.

Entrepreneurship and its place in economy

One of the possible ways of improving the difficult situation is promoting the development of entrepreneurship and teaching it. Teaching entrepreneurship is not a new trend – first attempts at introducing it to academic were made in mid-20th-century[6]. It is believed in Europe and in the United States that entrepreneurship is indispensable for the process of economic growth and that it positively impacts innovativeness[7]. Moreover, entrepreneurship has a positive impact on the number of new jobs created[8]. A study carried out in 2007 by C. Van Praag

[3] However, a strong positive correlation has been fund among Afro-American and Hispanic population.

[4] S. Wennekers, A. van Stel, R. Thurik, P. Reynolds, *Nascent Entrepreneurship and the Level of Economic Development*, "Small Business Economics" 2005, Vol. 24, No. 3, p. 300.

[5] M. Fritsch, A. Schroeter, *Why does the effect of new business formation differ across regions?*, "Small Business Economics" 2011, Vol. 36, No. 4, pp. 384–396.

[6] A. Klucznik-Törő, *Nauczanie przedsiębiorczości w świetle światowej literatury przedmiotu*, "E-mentor" 2012, No. 5, http://www.e-mentor.edu.pl/artykul/index/numer/47/id/966 [access: 13.03.2013].

[7] H. Oosterbeek, M. van Praag, A. Ijsselstein, *The impact of entrepreneurship education on entrepreneurship skills and motivation*, "European Economic Review" 2010, No. 54, pp. 442–454.

[8] R. Klapper, S. Tegtmeier, *Innovating entrepreneurial pedagogy: examples from France and Germany*, "Journal of Small Business and Enterprise Development" 2010, Vol. 17, No. 4, pp. 552–568.

and P. Versloot led to a conclusion that teaching entrepreneurship is reflected in an increase in employees' efficiency. The authors also proved that the perception of the business world depends on the level of individual entrepreneurial competences. The respondents' sex was of no importance whatsoever. Entrepreneurial intention rates (willingness to conduct a business activity) proved very similar in men and women. Entrepreneurship turns out to be the key to not only one's own business but also to being a better (more effective) employee[9].

Entrepreneurship based on the Global Entrepreneurship Monitor (GEM) results

Prepared annually, the Global Entrepreneurship Monitor is one of the most detailed reports on entrepreneurship around the world. The initiative was first taken in 1999 by Babson College from Boston and London Business School. The primary goal of GEM is to compare a diverse spectrum of entrepreneurship manifestations with the use of an originally developed methodology. Other objectives of the project also include: (1) measuring differences in entrepreneurial activity across particular countries, (2) identifying factors determining the level of entrepreneurial activity, (3) identifying systemic solutions increasing the level of entrepreneurial activity. In 2010, the survey covered 59 countries. The survey is conducted by national teams and comprises two parts – a questionnaire (covering very big samples – about 2000 respondents in Poland only) and interviews with experts[10]. Questions asked in the questioners concern, among other issues, involvement in establishing a company, financing its activity and cultural factors that influence entrepreneurship.

A number of indicators constitute an outcome of the GEM study, the most important of which, the Total early-stage Entrepreneurial Activity (TEA), reflects the proportion of people in productivity age engaged in establishing their own business activity or running a new firm (up to 42 months in operation). Another index developed by the scholars from Babson College and London Business School is earmarking dynamic companies (*high-potential, high-expectation)* as a separate research subject. High-potential companies are defined as those which, in the initial phase of their operation, envisage reaching the employment target of 20 people within five years from the lunch of the company's operations. These companies constitute a tiny fraction of the total number of enterprises but their role in the economy is much more significant than that of

[9] C. van Praag, P. Versloot, *What Is the Value of Entrepreneurship? A Review of Recent Research*, Discussion Paper No. 301, Institute for the Study of Labor, 2007, pp. 20–24.

[10] M. Bratnicki, P. Zbierowski, R. Kozłowski, *Czynniki wpływające na kształtowanie przedsiębiorczości w kontekście badań Global Entrepreneurship Monitor*, http://fundacja.edu.pl/przedsiebiorczosc/_referaty/sesja_IIIb/27.pdf, p. 4.

firms set up as sole proprietor business activities right from the outset. Most importantly, creating new jobs, they have a more positive impact on the labour market situation.

Another important element introduced by the authors of the report to the analyses of the phenomenon of entrepreneurship is distinguishing two types of entrepreneurship on the basis of motivation behind establishing a given enterprise:

– necessity-based entrepreneurial activity,
– opportunity-based entrepreneurial activity.

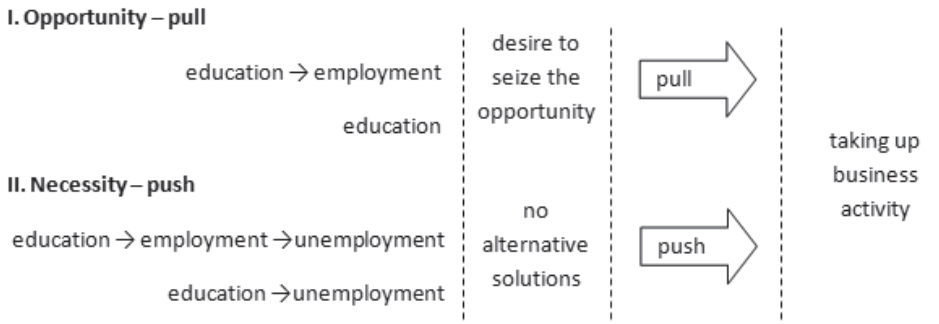

Figure 1. Two GEM-derived entrepreneurial models

Source: K. Bacławski, M. Koczerga, P. Zabierowski, *Polacy – przedsiębiorczym społeczeństwem? Global Entrepreneurship Monitor Polska 2004*, Fundacja Edukacyjna Bachalski, Warszawa–Poznań–Katowice 2005, p. 15.

The first type concerns entrepreneurial activities implemented due to lack of alternative opportunities, often resulting from unemployment. The other pertains to recognising business opportunities and being eager to benefit from them. The second type of motivation opens opportunities for faster growth of the enterprise and is connected with the higher survival index and better financial results[11] of the latter. Figure 1. shows a graphic presentation of these two types of entrepreneurship.

Results of studies conducted within GEM can be referred to here which clearly show that in Poland, for instance, 50% of entrepreneurs are individuals forced to run a business activity.

Analysing the obtained results, the researchers observed that the highest TEA indices are reported in the countries with the lowest level of economic development (e.g. Peru, Colombia, the Philippines, Jamaica). A slightly lower level of entrepreneurship has been reported in economically highly developed countries (Australia, the USA, Norway, Iceland), whilst the lowest results were observed in the countries ranked mid-range. This phenomenon, known as the *U-shape curve*, is depicted in Figure 2.

[11] Ibidem, p. 5.

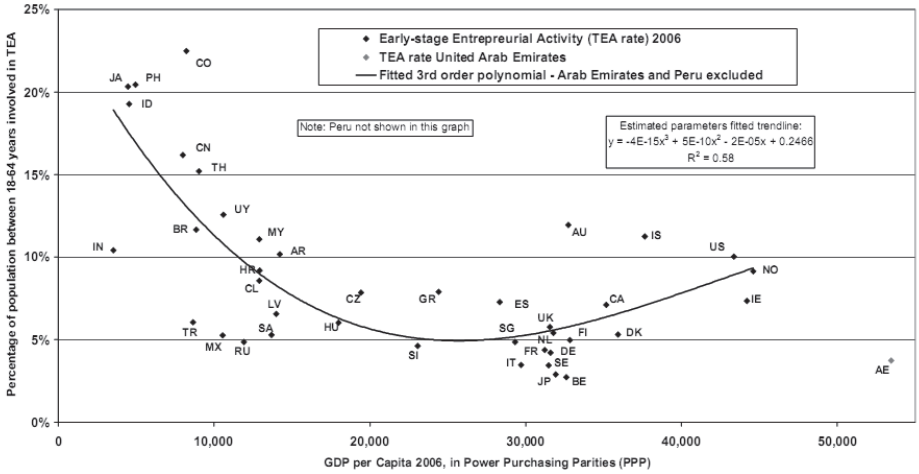

Figure 2. Entrepreneurship rate according to GEM (2006)

Source: M. Bartnicki, P. Zbierowski, R. Kozłowski, *Czynniki wpływające na kształtowanie przedsiębiorczości w kontekście badań Global Entrepreneurship Monitor*, http://fundacja.edu.pl/przedsiebiorczosc/_referaty/sesja_IIIb/27.pdf, p. 9.

It is noteworthy that the dependence is L-shaped according to the latest studies, as presented in the following figure.

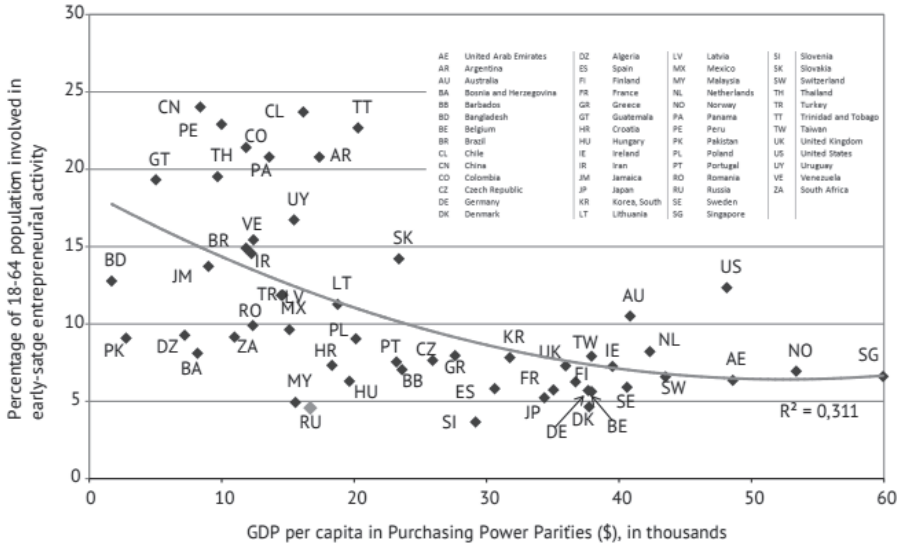

Figure 3. Entrepreneurship rate according to GEM (2011)

Source: O. Verkhovskaia, M. Dorokhina, Global Entrepreneurship Monitor, Russia 2011, http://www.gsom.spbu.ru/images/upload/news/2012/full_gem_eng.pdf, p. 24.

Entrepreneurship in academic curricula

As has been mentioned, the idea of teaching entrepreneurship at higher education facilities initially failed to evoke a positive response. Many opinions undermined the rationale behind developing specialised entrepreneurship-oriented courses. Odds were also against the quality of scientific research on the discipline as well as the necessity to set up separate faculties at universities for teaching entrepreneurship and to employ new staff members. Determining which methods of teaching entrepreneurship were effective, i.e. those that would really stimulate entrepreneurship[12], proved to be yet another obstacle. References emphasise that increasing the dynamics of entrepreneurship development is one of the aims of teaching entrepreneurship. However, as observed before, this aim cannot be reached without a proper state policy, efficient governmental institutions or an overall culture of a given nation, which, for instance, is open to risk taking.

The study results available confirm that professional intentions connected with the choice of one's career path and willingness to become an entrepreneur depend to a high extent on one's faith in his or her effectiveness, especially as regards the effectiveness of their entrepreneurial activities[13]. This faith is not constant throughout all our lifetime – it can be stimulated or suppressed.

As observed by A. Klucznik-Törő, the following factors are significant for the strengthening of entrepreneurial awareness[14]:

- mastery experiences – internal conviction that we will live up to the tasks set, which results from our previous successful experiences (learning by doing seems to play the major role in building faith in our own effectiveness);
- modelling – creating simplified schemes of entrepreneurial activities in order to observe them and gain better understanding of them;
- social persuasion – incentive and positive feedback from people who are authorities on entrepreneurship – teachers, lecturers, trainers, mentors, coaches.

Curricula for teaching entrepreneurship should take the factors described above into account to strengthen the students' self-esteem (i.e. build their confidence in their self-development in terms of entrepreneurial skills and faith in possessing such skills), to design enterprise development models (e.g. applying simulations) and to persuade the students to launching their own business activity, e.g. by meeting those who have succeeded in business.

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[12] J.O. Fiet, *The pedagogical side of entrepreneurship theory*, "Journal of Business Venturing" 2001, Vol. 16, No. 2, p. 104, [in:] A. Klucznik-Törő, *Nauczanie przedsiębiorczości*…

[13] F. Wilson, J. Kickul, D. Marlino, *Gender, Entrepreneurial Self-Efficacy, and Entrepreneurial Career Intentions: Implications for Entrepreneurship Education*, "Entrepreneurship: Theory & Practice" 2007, Vol. 31, No. 3, pp. 396–400, [in:] A. Klucznik-Törő, *Nauczanie przedsiębiorczości*…

[14] A. Klucznik-Törő, *Nauczanie przedsiębiorczości*…

One could ask to what extent entrepreneurial skills make it easier for students to find their place in the labour market. According to studies conducted in Poland by A. Budnikowski's research team, entrepreneurship is not a factor that would positively influence ones chances of employment[15]. In a study on the degree of significance of competence in university graduates – entrepreneurship ranked among those of the lowest significance out of 33 competences evaluated, surpassing only certificates and diplomas as well as professional experience. It is a paradox from employers' standpoint that entrepreneurship turns out to be a feature of little use as opposed to e.g. communication skills, command of foreign languages, commitment and responsibility.

However, striving to generate a new type of active participants in the labour market, universities should engage in running entrepreneurship courses. As is shown in research, there is still a lot to be done about teaching this kind of topics. Setting up enterprises by university graduates is still a marginal phenomenon e.g. in France[16]. University graduates prefer working for big companies, consulting firms or joining the public sector. Similar is the case of Germany. Out of 58 existing entrepreneurship chairs and further thirteen established recently in course of a planning process less than one third is indeed related to the domain of teaching entrepreneurship. Based on these data, however, it is clear that the Germans have taken a far more dynamic and active approach to developing entrepreneurial education, having increased the number of entrepreneurship chairs considerably as compared to the 20[17] that existed back in 1998.

Central Europe has not shone particularly bright in terms of developing entrepreneurial skills either. Research carried out in Central, Southern and Eastern Europe (Estonia, Lithuania, Poland, Czech Republic, Slovakia, Hungary, Albania, Russia, Belarus, Ukraine, Moldova, Georgia, Armenia and Azerbaijan) prove entrepreneurial education not to be popular at higher education facilities in the region. It has been discovered that entrepreneurship courses are offered rather seldom (in but 42% of all the 774[18] universities under analysis).

Authors of the studies conducted indicate major obstacles and problems with teaching entrepreneurship in Central Europe:

- teaching in national languages dominates;
- pseudo-business courses with passive teaching methods prevail;
- the courses do not include teaching of terms from the realm of entrepreneurial creativity, innovativeness, psychology;

[15] A. Budnikowski, D. Dabrowski, U. Gąsior, S. Macioł, *Pracodawcy o poszukiwanych kompetencjach i kwalifikacjach absolwentów uczelni – wyniki badania*, "E-mentor" 2012, No. 4, http://www.e-mentor.edu.pl/artykul/index/numer/46/id/946 [access: 13.03.2013].

[16] R. Klapper, S. Tegtmeier, *Innovating entrepreneurial pedagogy: examples from France and Germany*, "Journal of Small Business and Enterprise Development" 2010, Vol. 17, No. 4, pp. 552–568.

[17] Ibidem, p. 556.

[18] U. Varblane, T. Mets, *Entrepreneurship education in the higher education institutions (HEIs) of post-communist European countries*, "Journal of Enterprising Communities: People and Places in the Global Economy" 2010, Vol. 4, No. 3, pp. 204–219.

– the course tend to diverge from the methods of activity-oriented teaching rather than move towards them,
– practical teaching is lacking (talks, interview, meetings with entrepreneurship experts).

Other very interesting research into academic entrepreneurship has been conducted by J. Cieślik, J. Guliński, K.B. Matusiak, A. Skala-Poźniak[19].

The authors stress in their book an integrated model of supporting innovative academic entrepreneurship and a framework concept of teaching entrepreneurship by referring to a large number of practical examples. They present specific plans of courses at foreign universities and discuss the structure of classes dedicated, for example, to the stages of establishing one's start-up. They also mention some of the best practices from Poland.

Labour market and entrepreneurship development-oriented EU activities

Labour market related issues became more central to the EU in the mid 90s when the European Employment Strategy (EES) was adopted. Back then, the situation resembled the current one, with unemployment on the rise and budgetary savings at the forefront[20]. The EES, as a response to the situation, was to improve the general condition of the European labour market. The Strategy introduced a novel method of managing employment and served as a supplement to the emerging Economic and Monetary Union (EMU). Rather than harmonise national institutions of the labour market, the EES initiated the process of coordinating "soft" employment policy across member states. In consecutive years, European authorities gradually strengthened the significance of the employment policy within the framework of the Lisbon Strategy of 2000 and at its re-adoption in 2005 under the heading of "Growth and Jobs."

It was the study by F. Heylen and A. Van Poeck[21], among other reasons, that brought about the interest in teaching entrepreneurship. The study showed a strong divergence in unemployment rate values across member states between 1979 and 1993 (Belgium, Denmark, France, West Germany, Ireland, Italy and Holland). Also G. Saint-Paul saw increasing differences across the states that manage unemployment-related issues well and those that are not as successful, with Italy, Germany and France among the latter in the study. He also described

[19] J. Cieślik, J. Guliński, K.B. Matusiak, A. Skala-Późniak, *Edukacja dla przedsiębiorczości akademickiej*, PARP, Poznań–Warszawa 2011.

[20] T. van Rie, I. Marx, *The European Union At Work? The European Empolyment Strategy from Crisis to Crisis*, "Journal of Common Market Studies" 2012, Vol. 50, No. 2, pp. 335–356.

[21] F. Heylen, A. Van Poeck, *National Labour Market Institutions and the European Economic and Monetary Integration Process*, "Journal of Common Market Studies" 1995, Vol. 33, No. 4, pp. 573–595.

a significant discrepancy between unemployment rate values in European countries (EU-15 without Luxemburg but with Norway) since the mid 1980s[22].

For decades since the European Community was established in 1958[23], employment policies have been implemented on a national level. However, due to the studies referred to above, among other reasons, EU representatives were prompted to develop principles and priorities governing employment policy oriented activities. The European Employment Strategy was based on 4 pillars:

- employability (e.g. career counselling development, life-long learning programmes for the unemployed, qualification enhancement courses),
- employers' and employees' adaptation capabilities (promoting flexible forms of employment and up-to-date organisation management forms),
- equal opportunities (vocational development for disabled people, creating equal opportunities for men and women on the labour market),
- entrepreneurship (changes concerning setting up a business activity).

Clearly, entrepreneurship was defined in somewhat minimalist terms with special focus on lifting bureaucratic barriers. As time went by, those priorities have been broadened, and more detailed guidelines were added, e.g. on reducing regional discrepancies in employment, limiting the underground economy, etc.

The European Employment Strategy has to be observed by all member states, as the European Council periodically evaluates their progress in a Joint Employment Report, at the same time setting activity paths for the future, the so-called Employment Guidelines. It is based on these guidelines that EU states are obliged to develop their own National Action Plans for Employment.

The EES outcomes were studied by, among others, C. Perugini and M. Signorelli, who found out that in the period 1997–2006 the EU-15 states improved their performance with respect to unemployment rates, long-term unemployment indices and employment rate. Employment rates levelled throughout the period. As regards unemployment indices and long-term unemployment, such convergence occurred with a certain delay. Econometric analyses led the authors to the conclusion that changes of this kind cannot be attributed to the effects of an overall economic growth, macroeconomic fiscal policy or single currency. They believe the EES[24] impact may be the answer.

Also research by T. van Rie and I. Marx[25] indicate that the divergence trend for the EU-12 has generally diverted, as implied by a better performance and stronger convergence ever since the EES implementation. However, the authors caution against assuming a cause and effect relation between the EES, improved

[22] G. Saint-Paul, *Why are European Countries Diverging in their Unemployment Experience?'* "Journal of Economic Perspectives" 2004, Vol. 18, No. 4, pp. 49–68.

[23] The Treaties laying the foundations for the EC were signed in March 1957 in Rome; they came into force on 1 January 1958.

[24] C. Perugini, M. Signorelli, M., Labour *Market Performance Differentials and Dynamics in the EU-15 Countries and Regions*, "European Journal of Comparative Economics" 2007, Vol. 4, No. 2, pp. 209–262.

[25] T. van Rie, I. Marx, *The European Union At Work? The European Employment Strategy from Crisis to Crisis*, "Journal of Common Market Studies" 2012, Vol. 50, No. 2, pp. 335–356.

performance and convergence trends in the EU. It might have been the case that the reported improvement and convergence in Europe resulted from a parallel focus on reforms in capital cities of particular member states. In this scenario, the EES constitutes a formalised expression of such efforts rather than an external catalyst driving the convergence.

Nevertheless, as stipulated in previous subsections, the advent of the economic crisis had quite a strong impact on the EES effectiveness. Moreover, unemployment and employment indices are not just a reflection of policy changes. They are heavily influenced by macroeconomic variables. To respond to the crisis, the EU introduced a new set of changes to the EES. In 2012, the so-called employment package was introduced. Its objectives include[26]:

- supporting the creation of new jobs
- limiting work-related taxes,
- efficient use of subventions for aiding employment,
- benefiting from the potential of key sectors such as green economy, ICT, healthcare and nursing.
- restoring dynamics to labour markets
- supporting employers in a successful change of occupation or return to work,
- activating all stakeholders to introduce the reforms required,
- investing in skills defined on the basis of more accurate demand forecasting and monitoring,
- supporting free flow of labour.
- streamlining employment-related management strategies
- tighter monitoring of the latter in cooperation with EU states so that social and employment issues are not treated as subsidiary to economic ones.

The European Union has also been implementing a policy focusing on entrepreneurship development. The European entrepreneurship policy has traditionally emphasised the need to create the best possible micro and macro environment for small-sized companies, favourable to entrepreneurship.

Defining entrepreneurship and deciding on which forms of the latter to support is a problem yet to be solved. The issues of defining or more critical political issues – an answer to the "what to support" question – come down to identifying whom do we find to be entrepreneurs. They constitute a no mean homogeneous group. A few classification axes could be adopted:

- innovative entrepreneurs vs. imitating entrepreneurs[27],
- productive, unproductive and destructive entrepreneurs[28],
- opportunity-made entrepreneurs vs. necessity-made ones[29].

[26] http://ec.europa.eu/social/main.jsp?catId=101&langId=pl [access: 13.03.2013].

[27] J. Schumpeter, *Teoria rozwoju gospodarczego*, PWN, Warszawa 1960.

[28] W. Baumol, *Entrepreneurship: Productive, Unproductive, and Destructive*, "The Journal of Political Economy" 1990, Vol. 98, No. 5, Part 1, pp. 893–921.

[29] P.D. Reynolds, S.M. Camp, W.D. Bygrave, E. Autio, M. Hay, *Global Entrepreneurship Monitor. 2001 Executive Report*, Kauffman Foundation, Kansas 2001.

If this heterogeneity be ignored, the guidelines (policies) stipulated might favour certain forms of entrepreneurship, and prove to be neutral or even harmful to the others.

According to C. Roman, E. Congregado and J.M. Millan, the most important political initiatives pertaining to entrepreneurship reveal discrepancies between politicians' words and their deeds as well as their bias against promoting a shift from unemployment to self-employment, which is used as an instrument within the framework of active labour market policies for reducing unemployment[30]. This leads to a question whether the suggested promotion of entrepreneurship, identified with self-employment, offers a really good solution to the problems of the labour market.

Another important question is that of assessing the effectiveness of measures aimed at developing entrepreneurship. There is not much research material that would hint at which types of measures are the best or whether developing entrepreneurship in the ways currently applied makes sense. Also an assessment of the quality of new enterprises is worth considering. Surely, the whole group of entrepreneurs cannot be treated as a homogeneous one. A majority of them are those who do not employ staff and do not generate innovation or a significant added value. Again, one could ask: Is increased self-employment a really good solution?

Entrepreneurs, neither micro nor big ones, should be perceived as isolated and autonomous decision makers, but as players participating in a certain micro and macroeconomic context instead. Understanding the way in which environment related factors may influence entrepreneurs' decisions can be paramount to improving the effectiveness of activities aimed to stimulate entrepreneurship. Research results[31] indicate that social capital and networking contacts are very strong and unvarying factors crucial at making an individual decision about starting and running a business activity. Nevertheless, these elements are practically non-existent in the theory of teaching entrepreneurship or in curricula meant to develop the latter.

Yet another problem that scholars still need to solve is an assessment of the relationship between individual decisions about launching one's business activity and the environment on a macro level, particularly (i) an economic situation, (ii) expenditure on incentives to set up firms and (iii) the degree of labour protection. It can be assumed that recession periods and stimuli to establish firms encourage one to decide in favour of setting up one's own business activity. On the other hand, a strong labour protection law protecting employees may discourage a prospective entrepreneur from making this decision. The question remains whether this kind of influence does not distort the labour market and whether it

[30] C. Román, E. Congregado, J.M. Millán, *Start-up incentives: Entrepreneurship policy or active labour market programme?*, "Journal of Business Venturing" 2013, No. 28, pp. 151–175.

[31] Ibidem.

really promotes entrepreneurship proper rather or merely creates a space for an untypical form of employment, which self-employment is turning into.

Recapitulation

In the light of shrinking and volatile markets as well as decreasing demand, a number of companies have undertaken a search for ways to survive and develop. Entrepreneurial approach to running a business (creativity, innovative approach and commitment) becomes a quality that also large companies look for. However, this kind of approach has not yet become a distinguishing feature of large corporations or stable medium and small-size enterprises. Big companies are limited by internal structures, systems and procedures, and, most of all, by their organisational structure developed over many years. Similar is the case of SMSs relying on proven patterns that have borne fruit thus far. In this case ideas are lacking or, paradoxically, they abound, but competences or the skill of appropriate selection and implementation are insufficient. Any of those situations constitutes a challenge on the one hand, but an opportunity for higher education facilities on the other, as they may offer solutions satisfying the needs of the labour market and entities operating within it.

Further in-depth analyses are required to gain an insight into the relationship between education and entrepreneurship. It has been indicated that there are numerous controversies and extremely antithetic opinions on this subject matter. Thorough and veritable understanding of the nature of the relation between the factors enumerated will make it possible to increase the efficiency of teaching entrepreneurship. That is why it is worth taking up the challenge, even if merely to contribute to enlarging knowledge of the subject.

Currently, in the light of the publications referred to in the present chapter, teaching entrepreneurship appears to be a formalised process, usually part of different kinds of programmes and courses. Broadly defined, however, entrepreneurship is, above all, an attitude, the ability to spot opportunities and the skill of taking them. Thus its development can be attained within an appropriate organisation culture, e.g. of a university or school, and not just through attending entrepreneurship courses.

Providing support to entrepreneurs or prospective entrepreneurs, who have significant potential and chances that their business will flourish and generate jobs for others, is another area to cater for. J. Cieślik indicates the need to focus on dynamic businesses, suggesting that university graduates have a potential for creating this kind of enterprises[32]. He believes that when educating undergraduates, on different levels of education, one should aim to offer them knowledge

[32] J. Cieślik, *Przedsiębiorstwa dynamiczne: definicja, znaczenie w gospodarce, wyzwania w sferze polityki państwa*, "Kwartalnik Nauk o Przedsiębiorstwie" 2008, No. 2, pp. 23–32.

and skills (the skill of acquiring indispensable knowledge in particular) that would enable them to start up their own dynamic business, operate in the realm of dynamic organisations of different size, and also to be leaders of changes for enhanced growth in enterprises characterised by low dynamics. This kind of approach is likely to ensure better prospects for graduates on the labour market, improving their status quo.

Chapter 2

Methods of developing entrepreneurial skills

Methods of entrepreneurship teaching

The analysis of issues concerning entrepreneurship teaching (which can be referred to teaching of other subjects as well) leads to the conclusion that for years (some authors suggest that even for generations[1]) there has been no major improvement of teaching procedures or styles. If our grandparents went to university, they probably sat in classes with all other students looking in the same direction and tried to focus while a professor gave a lecture. This form of teaching remains an accepted standard in most subjects – professors lecture and students try to listen (or not). Obviously, some new technologies have appeared (projectors, PowerPoint presentations, whiteboards, etc.) and team exercises and group discussions are becoming increasingly common. However, one can hardly avoid an impression that if our grandparents came to a lecture hall, they would know exactly where to sit, what to do, and how to behave. One could even venture to claim that teaching methods have not changed substantially.

However, certain new trends are becoming more and more apparent, which may lead to changes in the process of skill teaching, including in entrepreneurship. One of the symptoms of such changes is the popularity of simulations and games.

Business trainings focused on developing skills in entrepreneurship are nothing new. They stem, alike numerous solutions used in management education, from military sciences, and in this particular example from war-games. In the 19th century, simulations of possible situations on a battlefield became used as a tool in training officers in the Prussian army[2].

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[1] G. King, M. Sen, *How Social Science Research Can Improve Teaching*, http://gking.harvard.edu/publications/how-social-science-research-can-improve-teaching, p. 1 [access: 15.03.2013].

[2] P. Rizzi, J. Woźniakiewicz, *Perspektywy zastosowania gier symulacyjnych w edukacji – teoria i praktyka*, "Homo communicativus" 2008, No. 3, pp. 57–62.

As a formula of supplementing the teaching process related to management education, simulations appeared in the mid-1950s[3]. Entrepreneurship education was launched at the Harvard Business School, where the subject entitled 'Management of New Businesses' was introduced in 1947, incidentally still considered to be the foundation of the School[4]. Classes involved the application of first simulation business games, which have changed their function during the last 60 years – from a supplementary exercise within a business course they have become a key element of economic education in some countries now[5]. However, creating business plans remains the most frequent form of business education, not just in Europe but in the US as well. This approach has one major fault, namely it ends with preparing a business concept and does not move on to the implementation phase, i.e. the establishment and management of a new business.

The simulation method gives a way to rectify this drawback. It is based on the concept of teaching through action. The simulation method is an excellent occasion for a student to gain experience and to assess the consequences of often risky and costly deals. Students have an opportunity to operate actively in the economic environment, thus extending their professional skills.

A teaching pyramid can be used to highlight the importance of using simulation, being the outcome of scientific work carried out by the American National Training Laboratory.

Traditional teaching methods include the top two levels of the pyramid, i.e. lectures and reading. Therefore, the level of knowledge retention amounts to 5–10%. On the other hand, teaching through experiences encompasses all the levels of the pyramid: from lectures and reading, through demonstrations, group discussions, to practice. In this case, the level of knowledge retention amounts to 80–90%. Simulation games are an excellent example of teaching through experience.

[3] Also in the 1950s, Jay W. Forrester prepared for his students at MIT (Massachusetts Institute of Technology) a Beer Game based on the experiences from the project implemented for General Electric. The Beer Game is a board game that illustrates a typical supply chain encompassing four sectors: sales, wholesales, distribution, and brewery. Each player manages one area. Despite the game being much simpler than the actual chain of supplies, players experience problems similar to ones that occur in real businesses.

[4] However, according to some publications, first solutions of this type were applied already in the 1930s.

[5] A.J. Faria, D. Hutchinson, W.J. Wellington, S. Gold, *Developments in Business Gaming*, "Simulation & Gaming" 2009, No. 40, pp. 464–487.

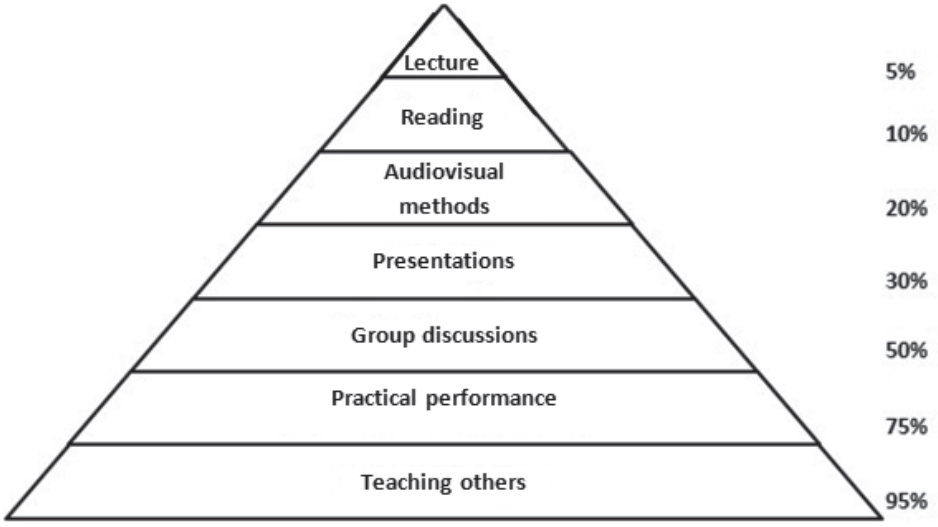

Figure 4. Teaching pyramid

Source: M. Taraszkiewicz, *Jak uczyć lepiej?*, Wydawnictwa CODN, Warszawa 2000, p. 87.

New methods of teaching entrepreneurship

Simulation games appear to be a comprehensive and flexible tool. As an educational technique, they require increased involvement both from a student and a teacher. As a result, this learning process is creative and based on own discoveries. Enhancing motivation is among the functions of a simulation game. What makes a simulation game an excellent motivating tool for its participants is an immediate response of the system to actions taken by players, the ability to assume roles that are not available in everyday life, and the capacity to experiment with ideas or situations that would be hazardous in real life. When playing a simulation game, one can feel satisfaction with fun while having the sense of being involved in something important and not losing one's time. Another important aspect is that simulation games are an exceptional communication tool, because they enable the constant and active participation in the process. Practically all other communication methods involve the existence of a receiver who has to remain passive for some time. Moreover, a failure in a game has a completely different dimension than a failure in ordinary school learning. Losing in a game is not perceived as an inability to do something one should know or be able to perform. Loss is merely the result of taking wrong decisions by a player that should be analysed to avoid the same mistakes in the future. Therefore, even a failure is something positive, as it constitutes the foundation

of learning[6]. As mentioned above, teaching entrepreneurship seems to be a trend that is experiencing a rise in popularity. The following new methods of teaching entrepreneurship are applied globally at present[7]:

- a two-path method – a very popular and dominant method applied at American colleges and universities. Teaching takes place in two ways – students discuss various aspects of starting and running a new business in workshops under the supervision of a teacher; in parallel, students prepare their business projects, usually in small groups. Some theoretic issues that are discussed in classes refer to specific business ideas prepared by students; thus, both paths intervene. The prepared business concepts are didactic by nature and are not meant for opening a real business, although sometimes new companies do get established as a consequence;
- a holistic approach – solutions of various problems concerning the operation of a new business are discussed in a broader context of their importance for the success of the whole enterprise and the impact on other, apparently remote areas. In this way, the method of analysing the situations and taking decisions can be reflected that is characteristic for dynamic entrepreneurs, which is referred to as the business management style;
- an integrated package of tools and methods – in Western universities and colleges, in particular American ones, the method of teaching with the parallel and interrelated use of diversified teaching tools is becoming increasingly popular. In addition to a traditional paper handbook, lecturers use additional teaching materials for their students that are placed on a dedicated website that gives teaching instructions and additional tools for lecturers. Moreover, a lecturer provides students with auxiliary electronic materials. Owing to this method, the forms of student work can be diversified and includes working in a large basic group (20–50 persons), in small groups on individual or team projects (3–5 persons), and individually. As a part of the teaching programme, students visit active entrepreneurs who are also invited as so-called visiting professors.

One of contemporary concepts that is used in teaching entrepreneurship is the idea of 'business in practice'. It belongs to the group of more general methods, as it includes less complicated simulation methods, such as role-playing, case studies, learning how to run virtual and newly-established businesses, and the use of computer simulations[8]. The variety of methods enables students to get an insight into the reality of enterprises. A virtual business means a dynam-

[6] M.L. Faccin, Giocare per educare o educare Giocondo, [in:] P. Rizzi (ed.), *Giochi di Città*, La Meridiana, Bari 2004, from: P. Rizzi, J. Woźniakiewicz, *Perspektywy zastosowania gier symulacyjnych w edukacji – teoria i praktyka*, "Homo communicativus" 2008, No. 3, pp. 57–62.

[7] J. Cieślik, *Kształcenie w zakresie przedsiębiorczości na poziomie akademickim*, a copied manuscript, pp. 5–6.

[8] I. Ebbers, C. Krämer-Gerdes, R. Schulte, M. Seitz, *Activity-based start-up simulations in entrepreneurship education at the German universities*, "Electronic Journal of Family Business Studies" 2009, Issue 2, Vol. 3, pp. 118–134.

ic simulation model of a firm and it reconstructs a model of entrepreneurship. A model sometimes reduces the realism in order to highlight the important and interesting aspects in a seminar. Experiences gained in such simulations can be used in real life.

A virtual business is a dynamic simulation model of a firm. Being a model, it does not recreate any original realistic situations but rather reduces the reality in certain aspects in order to highlight important and interesting elements of e.g. a subject or issue. As a result, complicated processes become comprehensible while interrelationships and strategies of business processes become identifiable, which strengthens the active professional skills.

This approach is aimed at raising the awareness of self-employment as an alternative career path and enables those who have never been involved in the process of opening a business to consider such a step. Action-based learning is used not only to teach entrepreneurial skills but is also aimed at encouraging to taking independent actions on one's own account as well as at strengthening the self-reliance and faith in one's ideas and to encourage to openness to new experiences. Moreover, it stimulates creativity and promotes teamwork, while enabling to learn some routine work related to establishing a new business. Entrepreneurship should be encouraged and taught; however, a realistic approach should be conveyed, to enable the understanding of one's strengths and weaknesses. This will help clarify some unrealistic images of entrepreneurship and may in some cases result in discouraging from starting a business. In a scientific environment, students may raise their professional qualifications through actions and decision-taking, combined with a high level of autonomy in their activities, to get an insight into the reality of business. As a consequence, a competence profile necessary to start a simulation in a virtual business corresponds closely to the scope of skills necessary to launch a new business.

A certain variant of the 'business in practice' concept is the transfer from the stage of creating own businesses or more common projects that involve finding solutions to actual business problems (not as case studies but based on actual current problems). Benefits from this type of teaching method can be derived both by students and scientific institutions that organise such projects and entrepreneurs. An advantage gained by a student is the improvement of one's skills in creating projects and gaining greater self-confidence by working on a real project. Another advantage is the use of knowledge received at university to discuss an actual problem experienced by an entrepreneur. Owing to so-called 'brainstorms' that are used in creating a project, students learn how to work in teams. They no longer work as individuals but rather try to solve a problem together. Students can appreciate the importance of the course as they can understand that knowledge gained from books only is not sufficient to handle real problems on the market. Internet is also not sufficient to find solutions to most problems faced by businesses. Finally, the responsibility of a student towards a real client makes the performance of work even more precise than one could expect in ordinary university classes.

Scientific institutions are another beneficiary of organising courses that involve business projects. Owing to such courses, institutions are perceived as more society-friendly through their support for business. Classes are given in such a manner as not to teach about business but to teach being in direct contact with business. Therefore, one can become more committed to a project and learn how to think more critically. A role of a teacher changes from the role of an instructor to a role of an assistant in education. It also broadens the teaching experience of teachers.

Businesses that use student-managed projects should be also satisfied with such cooperation. A large number of students are involved in developing a project, which can be treated as a business promotion among them. Secondly, they have similar or even better ideas than professional consulting service providers. Furthermore, students are often customers of businesses for which they create projects – therefore, they are interested in a good shape of the firm. Projects may be targeted at SMEs or non-profit organizations that cannot afford to employ expensive consultants. In case of larger enterprises, the assistance of students is also worthwhile, as their advice is often of quality and originality equivalent to consultation given by independent consultants.

The above-mentioned form of teaching gives numerous benefits, although it is still not used commonly. The reason may be some formal barriers or the fear of this type of work form (especially among teachers and businesses). An intermediate model between the typical ex catedra approach and the above-mentioned approach is the application of business simulations that help one have a feel for the role of a manager and understand his problems, however without bearing the tangible effects of real risk[9].

The popularity of new technologies has been a crucial element affecting the method of business training and teaching. IT has changed our lifestyle in a major way. There is mounting evidence that today's students grow in the environment that is saturated with media, surrounded by videos, consoles, and computer games. According to research conducted in the United States at the beginning of the 21st century, before the end of secondary education 77% respondents had played computer games and more than two-thirds (69%) had played video games since primary school[10]. It seems that these estimates are not inflated and can be transferred to other developed countries without any major risks. When next years of students graduate, practically all of them will have had some game experience. The present generation of students (aged 18–22) often consists of experimenting students who prefer to learn by doing something rather than by lis-

[9] *Symulacje menedżerskie i studia przypadków – szkolenia biznesowe w oparciu o symulacje menedżerskie i studia przypadków – najlepsze praktyki*, A. Poszewiecki, W. Bizon, P. Kulawczuk (ed.), Wydawnictwo Uniwersytetu Gdańskiego, Gdańsk 2012, p. 20.

[10] S. Jones, *Let the Games Begin: Gaming Technology and Entertainment among College Students*, Pew Internet & American Life Project, 2003, available on the website: http://www.pewinternet.org/Reports/2003/Let-the-games-begin-Gaming-technology-and-college-students.aspx [access date: 9 April 2012].

tening. In this respect, games give numerous chances of developing the effective teaching environment, as they contain elements of sudden changes, complexity, learning through trial, making mistakes, and scoring. They also support active and experimental learning as well as problem resolution. Games make it possible to use information in a set context and are generally strongly student-focused. Furthermore, they usually provide fast access to feedback. According to results of tests, students who use games think that difficult tasks can be absorbing, intriguing, and funny if they are included in a meaningful story or relevant context.

Background and the present of business games and simulations

Direct predecessors of contemporary business games and simulations date back to 1932 in Europe and 1955 in the United States[11]. Since the appearance of simulations in the States, their number started to grow quickly. In 1961, it was estimated that there were more than 100 business games in that country used by more than 30 thousand directors and great many students[12]. The research conducted in 1955 revealed that 97.5% schools that belonged to Association to Advance Collegiate Schools of Business (AACSB) used at least one simulation game[13]. According to research conducted by T.F. Burgess, 92% faculties of economics and management at technical universities and almost 50% universities used some forms of simulation games in their curricula[14]. It can be noted that simulation games are applied at present on even a greater scale in the economics and business education, due to the development of the game industry. Key milestones of the business simulation game history in recent years are presented in table 3.

A change of business practices develops the demand of the labour market that requires students to learn in experimental education that involves practical placements, business plan competitions, and business simulations, which are an important supplement to other teaching methods[15]. Therefore, the success of business games in recent years can be attributed to the degree they respond to the changes in focusing the educational process on experimental education, the development of decision skills, the promotion of teamwork, motivating students, applying theory in practice, and the involvement of students (active learning).

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[11] A.J. Faria et al., *Developments in Business Gaming…*, p. 211.

[12] Ibidem, p. 221.

[13] A.J. Faria, R. Nulsen, *Business Simulation Games: Current Usage Levels a Ten Year Update*, "Developments in Business Simulation & Experiential Exercises" 1996, No. 23, pp. 22–28.

[14] T.F. Burgess, *The Use of Computerized Management and Business Simulation in the United Kingdom*, "Simulation & Gaming" 1991, No. 22, pp. 174–195.

[15] G.J. Summers, *Today's Business Simulation Industry*, "Simulation & Gaming" 2004, No. 35, pp. 208–241.

Table 3. Stages of business game development

Stage	Period	Development
I	1955–1963	Creating and developing games with manual scoring
II	1962–1968	Creating centralised business games and commercial game development
III	1966–1985	A period of quick development of centralised games and a major increase in business game complexity
IV	1984–2000	Development of computer games and decision aids used in business games
V	1998–	Increased availability of business games over the Internet and operated with central servers (e.g. CAPSIM and CAPSTONE series of business games and solutions by INNOVATIVE LEARNING SOLUTIONS and MARKETPLACE)

Source: Own study and based on D. Williams, *Impact of Business Simulation Games in Enterprise Education*, [in:] Paper presentations of the 2010 University of Huddersfield Annual Learning and Teaching Conference, University of Huddersfield, Huddersfield, pp. 11–20.

> 'As a teaching instrument, business simulations are extremely important at present. They make it possible to take business decisions dynamically, where players formulate strategies and next take a number of decisions aimed at implementing the strategy. Players receive feedback that shows consequences of their decisions and may assess their strategies and, if necessary, introduce their modifications. Experiences gained from the repeated iteration of decision periods provide players with direct feedback they can learn from[16]'.

The increased use of business games and simulations follows the change in the traditional paradigm of teaching and education, where the process of learning is perceived primarily in the categories of information process, towards more experimental education that takes place within the transformation of experiences, when a student is actively involved in practice[17]. Business games have generated a dynamic environment that presents a series of decision situations. Every cycle creates a new situation with new problems to solve and the necessity to take decisions. Simulations create almost 'real' experiences and help combine theory with practice, by developing the skills of the proper use of gained knowledge / skills. Business simulations recreate the experimental model of learning developed by D. Kolbe[18], where a business game creates a series of micro-experiences followed by immediate feedback as the game develops as well as the reflection

[16] A.J. Faria et al., *Developments in Business Gaming…*, p. 480.

[17] D.C. Thatcher, *Promoting Learning through Games and Simulations,* "Simulation & Gaming" 1990, No. 21, pp. 262–273; E. Clarke, *Learning outcomes from business simulation exercises*: *Challenges for the implementation of learning technologies*, "Education + Training" 2009, No. 51, pp. 448–459; T. Lainema, P. Makkonen, *Applying constructivist approach to educational business games: Case REALGAME*, "Simulation & Gaming" 2003, No. 34, pp. 131–149.

[18] The model of learning through experience consists of 4 steps: knowledge is gained through practice and experience; a specific experience encourages meaningful observations; reflection causes

and application of conclusions in a new situation[19]. On a practical level, there is strong evidence that business games constitute an important form of learning[20].

Contemporary business games and simulations are used in teaching a broad range of economics and management subjects, such as strategic management, marketing, project management, economics, and international business. Paradoxically, despite the rapid development of business education after World War II and the broad recognition of the value of experimental learning in entrepreneurship studies, the number of simulations available for this purpose is relatively low[21]. It seems that business simulation games may be an important element as a teaching instrument. A good business game can be complex and complicated but also flexible – an instructor has an option to determine the pace, complexity, and main simulation elements[22].

The growing interest in computer simulations results from the new environment where the present youth grows. It forces to create a new learning system that is based on computer games and simulations. According to research, the use of such tools affects the commitment of youth and develops their passions[23]. The following different areas of interest in simulation can be distinguished:

– developing specific curricula prepared in cooperation between academic teachers and game producers, and
– creating simulations (games) only by commercial entities.

The virtual learning environment (VLE) is used in higher education as a support tool. This form of learning is based on creating games with fun elements. This business is quite popular among the private sector that provides new products (simulations) addressed both to universities and businesses.

Controversies surrounding business education

Some questions must have arisen about the possibility of teaching entrepreneurship with any teaching methods. Professional educators claim that entrepreneurship is an element that can be developed and learnt. For example, profes-

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the formulation of abstract generalising rules used not just to describe a specific event but all similar events; the developed knowledge is verified with experiments.

[19] D.C. Thatcher, *Promoting Learning…*, p. 32.

[20] J. Washbush, J. Gosen, *An Exploration of Game-Derived Learning in Total Enterprise Simulations*, "Simulation & Gaming" 2001, No. 32, pp. 281–296; R.E. Wood, J.F. Beckmann, D.P. Birney, *Simulations, learning and real world capabilities*, "Education + Training" 2009, No. 51, pp. 491–510.

[21] J. Wolfe, G. Bruton, *On the Use of Computerized Simulations for Entrepreneurship Education*, "Simulation & Gaming" 1994, No. 25, pp. 402–415.

[22] P. Thavikulwat, *Computer-Assisted Gaming for Entrepreneurship Education*, "Simulation & Gaming" 1995, No. 26, pp. 328–345.

[23] R. Tunstall, M. Lynch, *The role of simulation case studies in enterprise education*, "Education and Training" 2010, Vol. 52, No. 8/9, pp. 624–642.

sor W.D. Bygrave from Babson College, a leading American business teaching institution, claims that:

> 'Yes, entrepreneurship can be taught, although we cannot guarantee that we will create a new Bill Gates or Donna Karan, just like a physics professor has no guarantee to educate a new Albert Einstein and a tennis coach to train a new Serena Williams. But if you give us students showing predisposition to establishing businesses, we will turn them into better entrepreneurs[24]'.

A positive correlation between special educational programmes and business activity is confirmed by G.T. Solomon, P.H. Dickson, and K.M. Weaver in the survey article entitled Entrepreneurial selection and success: does education matter. The authors have drawn such conclusions after analysing more than 50 studies published in scientific magazines in 1995–2006. Also the previous revisions of literature from 1985–1994 have led to the conclusion that entrepreneurship can be learnt, stimulated, and strengthened through education. Interestingly, other research conducted on 100 directors of businesses, i.e. persons whose views come from the business practice, showed their belief that while it is hard to influence one's personality, the definite majority of knowledge necessary to be an entrepreneur can be learnt[25].

Some authors present a different opinion, which does not mean that it differs by 180 degrees. P. Lewin claims that entrepreneurship can be learnt but it cannot be taught to someone else[26]. It can mean that nobody can teach future businessmen how to take decisions. They have to learn it themselves through experience and observation until they can predict that some choices will be right. Therefore, some time is necessary to gain knowledge of entrepreneurship. And various poor or unprofitable decisions or businesses that are doomed to failure may appear on the way to success.

Conclusions

Teachers of entrepreneurship face a major challenge to create learning conditions that comply with the environment where the youth grow. The present students mature in the epoch of computer experiences[27]. It is important to redirect the approach both of universities and students to make them aware that a university does not exist only to prepare graduates to the roles of a specialist or technical expert but rather to make a graduate capable of moving smoothly from

[24] *The Portable MBA in Entrepreneurship*, W.D. Bygrave, A. Zacharakis (ed.), John Wiley & Sons, Hoboken 2004, p. 2

[25] Study entitled: M. Balicka, *Kształtowanie postaw przedsiębiorczych studentów poprzez programy edukacyjne na przykładzie analizy efektów realizacji projektu: Jak uruchomić własny biznes – program szkoleniowo-doradczy dla studentów*, Warszawa 2010, pp. 4–6, *www.stolicabiznesu.warszawa.pl/index.php/ida/803/?getFile=384:0 [access*: 9.04.2012*]*.

[26] P. Lewin, *Entrepreneurial Paradoxes: implications of radical subjectivism*, http://www.utdallas.edu/~plewin/EntrepreneurialParadoxes.pdf, p. 7.

[27] R. Tunstall, M. Lynch, *The role of simulation case studies in enterprise education*, "Education and Training" 2010, Vol. 52, No. 8/9, pp. 624–642.

the world of science to the world of work as a person who can bring new ideas into a business, who is flexible, and ready for further education.

To create this type of a graduate who is flexible and competent when faced with different and constantly changing needs of industry, universities need to adopt an approach to designing and transferring a curriculum that will encourage to act and will be targeted outside. Traditional learning theories born out of the rational premise that learning is an individual activity, i.e. a linear process with a beginning and end, seem to be becoming more and more detached from reality and requiring significant modifications.

It is also noteworthy that in case of using simulations and games for business entrepreneurship, an important role is played by the proper preparation of a teacher to the didactic process. Only the fulfilment of this condition can provide the complete use of the simulation and game potential. Otherwise, the didactic effects of using new tools may be insignificant while teaching with simulation may turn into the thoughtless clicking exercise and moving to next pages.

Therefore, the conclusion drawn by a number of scholars[28] is that it is necessary to prepare and train teachers properly. Even teachers who are keen players do not have to know how to use games for didactic purposes. Therefore, teacher training is an important condition for achieving the final success. Teachers have to study closely each and every game and have to feel comfortable with them. They should set the targets of a game and its main premises so that students can take most advantage from playing.

Summing up, it seems that the trend that is becoming increasingly visible globally is the necessity to formulate curricula that will develop entrepreneurship among university students, both in terms of content and methods. Enterprise classes at universities should focus on practice as much as possible and should use modern teaching tools that enable to develop greater involvement of students and provide a more effective process of knowledge transfer. The content and methods of work with students have to be adapted to the course level and type as well as the objectives of classes. Thirdly, curricula should not include entrepreneurship in a too narrow scope, to prevent the paradox of limiting the entrepreneurship classes to the study of business plan preparation.

[28] *Best practices for using games and simulation*, http://www.siia.net/index.php?option=com_docman&task=doc_view&gid=610&tmpl=component&format=raw&Itemid=59 [access: 9.04.2012].

Chapter 3

Application of case study method. Conditionings and benefits

The essence of a case study method

All universities and business schools face the same difficult challenge: how to prepare students for the world of practice. A wide range of professional schools, including Harvard's law, business, and medical schools, have concluded that the best way to teach these skills is by the case method. The Law School led the way and case study as a teaching method was implemented in 1870. The Business School followed 50 years later. The Medical School began using cases only in 1985[1].

The case study method finds a growing application in education, becoming an increasingly popular technique used for varied educational tasks, mostly at universities that educate future economists, physicians, and lawyers. Business schools have been introducing case-study or so-called 'active learning' based educational programmes intensely. In addition to the Harvard University, where the case study method was developed at different departments, the method has been used commonly at other American colleges and universities. For example, the business school at the Fairfield University has reformed its curricula so that instead of individual long-term courses in management, marketing, production, finance, and IT systems, a student selects just one course. The course comprises cases that describe each of the above-mentioned disciplines and present it in a special manner. As a result, students start to realise relationships between different subjects and begin to think with broader categories, by asking questions and looking for solutions[2].

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[1] D.A. Garvin, *Making the Case. Professional Education for the World of Practice*, Harvard Magazine, September–October 2003, http://harvardmagazine.com/2003/09/making-the-case-html [access: 18.03.2013].

[2] Ż. Ptak-Kostecka, *Efektywność pełnienia ról menedżerskich*, rozdz. 4 - *Analiza przypadku, czyli metoda case study*, PhD thesis defended at Wrocław University in 2000, http://www.masterplan.pl/analiza-przypadku-czyli-metoda-case-study [access: 18.03.2013].

Harvard is indeed number one when it comes to case study teaching, estimating that 80% of all the teaching over the two-year program is delivered via cases. Harvard Business School leader's position is also evident by the leading role in the professional case writing. Faculty researchers and professors create more than 80% of the case materials used in business schools across the world[3]. The recent changes have put more team project work and experimental learning into the mix. It is still low in comparison to case study, but Harvard is now estimating that 10% of its learning is through team projects and 5% through experimental learning. The University of Western Ontario's Ivey School and the University of Virginia's Darden School reported that about 75% of their MBA programs are taught by case study. IESE Business School in Spain put the percentage at 70%, while UC-Berkeley's Haas School and North Carolina's Kenan-Flagler Business School both reported that half the content in their MBA programs are delivered via case study[4].

A case study is expected to capture the complexity of a single case, and the methodology which enables this has developed within the social sciences. Such methodology is applied not only in the social sciences, such as psychology, sociology, anthropology, and economics, but also in practice-oriented fields such as environmental studies, social work, education, and business studies[5].

The case study teaching method engages readers in active learning by putting them squarely in the shoes of real people wrestling with real dilemmas. As students read a case, prepare assignments, and actively participate in class discussions and exercises, they learn how best to approach the problems described in the case. Cases are used to illustrate a particular set of learning objectives, and (as in real life) rarely give the exact answers to the dilemma at hand. The case study will provide readers with an overview of the issue, background on the setting (typically the individual, company/institution, industry, and larger environment), the people involved, and the events that led to the problem or decision at hand.

Practitioners of the method draw attention to four important elements of the applied method, namely: preparation, observation, analysis, and experience. A case study solution does not have to be explicit, which makes this method different from an attempt at finding a clear answer to questions formulated in teaching. The task of a group and a leader is not to find 'the only right way' but rather to consider all possible 'pros and cons' together with their consequences, with the process of finding such advantages and threats being the most important element of the class.

The qualitative case study is an approach to research that facilitates exploration of a phenomenon within its context using a variety of data sources (Figure

[3] *Learning in Practice, Inside the Case Method*, Harvard Business School, www.hbs.edu/learning/case.html [access: 19.03.2013].

[4] J.A. Byrne, *How the World's Top Business Schools Teach Their MBAs*, http://poetsandquants.com/2012/11/18/how-the-worlds-top-business-schools-teach-their-mbas/ [access: 18.03.2013].

[5] R. Johansson, *Case Study Methodology*, A key note speech at the International Conference "Methodologies in Housing Research" organised by the Royal Institute of Technology in cooperation with the International Association of People–Environment Studies, Stockholm, 22–24 September 2003.

5). This ensures that the issue is not explored through one lens, but rather a variety of lenses which allows for multiple facets of the phenomenon to be revealed and understood[6]. R. Stake points out that as a form of research, case study is defined by interest in individual cases, not by the methods of inquiry used[7].

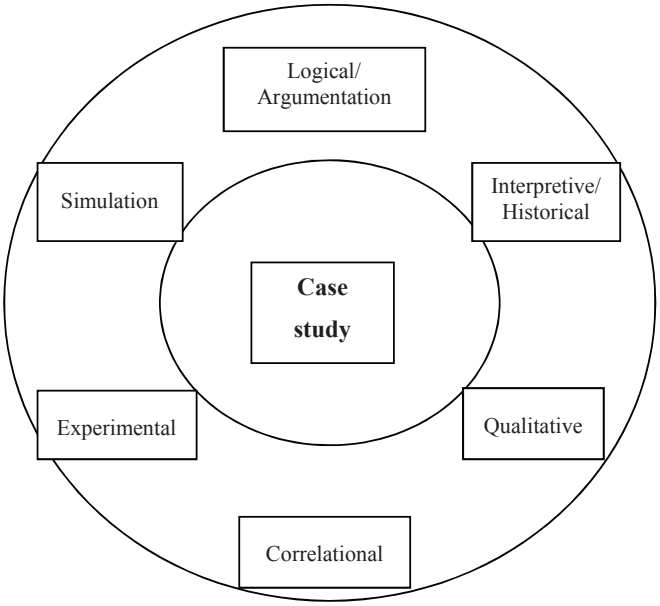

Figure 5. A conceptual framework for research methods

Source: R. Johansson, *Case Study Methodology*, A key note speech at the International Conference "Methodologies in Housing Research" organized by the Royal Institute of Technology in cooperation with the International Association of People–Environment Studies, Stockholm, 22–24 September 2003, p. 3.

The key role of an instructor – a mentor or a coach?

The case method is a form of instructor-guided, discussion-based learning. It introduces complex and often ambiguous real-world scenarios into the classroom, typically through a case study with a protagonist facing an important decision. The case method represents a shift from a traditional, instructor-centred model of education to a participant-centred one in which students play a lead role in their own and each other's learning. Case method instructors use questions, dia-

[6] P. Baxter, S. Jack, *Qualitative Case Study Methodology: Study Design and Implementation for Novice Researchers*, "The Qualitative Report" 2008, Vol. 13, No. 4, p. 544.

[7] R. Stake, Robert, *The Art of Case Study Research*, Thousand Oaks, London, New Delhi, Sage 1995.

logues, debates, and the application of analytical tools and frameworks to engage students in a challenging, interactive learning environment.

The role of the case method instructor is captured by the Latin verb educare – to lead out. The case method instructor must be well-prepared for both the content associated with each class session and the process for guiding the participant-centred learning experience.

Case studies are accompanied by teaching manuals or notes, which outline the basic premise of the case study, how it can be used within a course, learning objectives, assignment questions, a typical class discussion flow, and key takeaways. Teaching notes will often provide board plans, informational slides, exercises, and updates or epilogues to the case study. Faculty authors may also provide supplemental materials, such as 'what happened next' cases, role play instructions and exercises, videos, or suggested readings[8].

The case method evolved into a sophisticated instrument, which under a careful guidance of well-trained instructor may transform students' potential into a powerful competence of decision making. Unlike during the lectures, case method classes unfold without a detailed script. C. Christensen describes case method teaching as 'the art of managing uncertainty'. The teacher has a role of 'a director on the stage, planner, host, moderator, devil's advocate, fellow-student and judge'[9]. Case method teachers must learn to balance planning and spontaneity, they have to react on the challenges coming from the disputants' points of views as well as difficulties and barriers coming from the individual and group work. They guide the students through multiple levels of knowledge and of reflection, trying to work out with the participants, pros and cons and then the possible variety of solutions based upon shared experience and risk taking profile.

The role of an instructor and the content of case studies usually depend on the audience. The instructor may give a lecture on a topic pointing eventually some solutions to the students, however it will not enhance their ability of resolving the prudential problems[10]. The more students are experienced at identifying the criteria and relating the links and the more knowledge they have, the better the output of case method usage will be.

Depending on the level, the teacher may be a technical or a functional instructor, a specialist concerned on a very narrow field or a management professor, having multidisciplinary knowledge and expertise. Being a technical instructor requires general knowledge on the topic and some particular techniques referring to it. A functional instructor will have the same skills plus the ability of interpreting and using given knowledge[11].

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[8] *The Case Study Teaching Method*, Harvard Law School, http://casestudies.law.harvard.edu/the-case-study-teaching-method/.

[9] *Learning in Practice, Inside the Case Method*, Harvard Business School, www.hbs.edu/learning/case.html [access: 19.03.2013].

[10] J.C. Vázquez-Dodero, *The Case: the Instructor as "Choreographer"*, IESE Business School, University of Nawarra, ASNN-6-E, January 2001, p. 4.

[11] J.C. Vázquez-Dodero, *The Case: the Instructor…*, p. 9.

Still the case method should not be perceived as a tool of transmitting the knowledge, but rather as a tool of improving the independent thinking and the skills to transfer the unsolved problems into the plan of actions and decisions. This is the way in which the expert will face the problems based on his and the participants' experience in a demanding but enhancing way. The teacher's manner should be wise, practical and realistic, it does not include the gift of having the actor's skills, but rather a conductor dedicated to achieve individual and group results during a short moment in time.

The important role of participants – who will benefit the most?

The case study teaching method is appropriate for undergraduate, graduate, executive education, and professional development courses, workshops, and seminars. Instructors may assign questions prior to class to focus students on the particular issues they plan to address in the class session. A class session can include student-led presentations, exercises, role plays, debates, and summarizing lectures.

Table 4. Definition of different types of case studies

Case study type	Definition
Explanatory	It would be used if you were seeking to answer a question that ought to explain the presumed causal links in real-life interventions that are too complex for the survey or experimental strategies. In evaluation language, the explanations would link programme implementation with programme effects
Exploratory	It is used to explore those situations in which the intervention being evaluated has no clear, single set of outcomes
Descriptive	It is used to describe an intervention or phenomenon and the real-life context in which it occurred
Collective, multiple-case studies	It enables the researcher to explore differences within and between cases. The goal is to replicate findings across cases. Because comparisons will be drawn, it is imperative that the cases are chosen carefully so that the researcher can predict similar results across cases, or predict contrasting results based on a theory
Instrumental	It is used to accomplish something other than understanding a particular situation. It provides insight into an issue or helps to refine a theory. The case is of secondary interest; it plays a supportive role, facilitating our understanding of something else. The case is often looked at in depth, its contexts scrutinized, its ordinary activities detailed, and because it helps the researcher pursue the external interest.

Source: P. Baxter, S. Jack, *Qualitative Case Study Methodology: Study Design and Implementation for Novice Researchers*, "The Qualitative Report" 2008, Vol. 13, No. 4, pp. 547–549.

To solve a problem when to use a case study it is worth to analyze the argumentation of R.K. Yin[12]. According to him, a case study design should be considered when:

- the focus of the study is to answer 'how' and 'why' questions;
- you cannot manipulate the behaviour of those involved in the study;
- you want to cover contextual conditions because you believe they are relevant to the phenomenon under study;
- the boundaries are not clear between the phenomenon and context.

One of the common pitfalls associated with case study is that there is a tendency for researchers to attempt to answer a question that is too broad or a topic that has too many objectives for one study.

Students act as co-creators of the learning process in the case method. They are responsible for preparing the case in advance, first individually, and then often in small study groups. During the class session, students are expected to participate as contributors and as listeners to help advance their own learning and that of their classmates. Ideally, learning should continue after class as students reflect on the discussion and apply insights and lessons in the broader context of their academic, professional, and personal lives[13].

The fields, in which the case method will be successful, include management, logistics, sales and marketing, finance, law, strategy and organization, communication and information technology, media and many other areas. However, the more important issue, than specifying the kind of knowledge, is creating the ability to discover what is important in the specific problem, how the mechanism works, and what the relations between its main determinants are. It requires the discipline and understanding.

Another problem, in particular in teaching entrepreneurship with the case study method, is how to teach economists and non-economists. It seems that teaching should be the same; however, non-economists are forced to work harder to find out certain regularities economists are aware of. The same response cannot be expected from both groups; moreover, there is a temptation to reach non-economists in a simplified manner. However, economic knowledge is not the basic achieved outcome in the case study method. The objective is to gain an economic insight into relationships and data and the ability to explain certain mechanisms of the reality. Hence, an economic point of view should be manifested in the skill to perceive human actions and their tangible and measurable effects in the observed reality. Only such observations are taken into account that have an economic effect. For this reason, it will be much simpler for those with economic background than for those without such preparation[14]. This process of

[12] R.K. Yin, *Case Study Research: Design and Methods,* Thousand Oaks, CA, Sage 2003.

[13] *Case Method in Practice. Core Principles*, Harvard Business School, http://www.hbs.edu/teaching/case-method-in-practice/core-principles.html [access: 18.03.2013].

[14] J.C. Vázquez-Dodero, *Pillars of a Pedagogical Process for Educating Professionals of Action*, IESE Business School, University of Navarra, ASNN-2-E, October 1993, p. 2.

teaching may be defined as 'knowledge oriented', though, as it was explained about the essence of a method, it does not deliver the economic knowledge itself.

According to the users of the Case Simulator project given in its evaluation process, the case study method can be addressed well to various categories of recipients[15], such as:

- first-year students, to focus them on entrepreneurship and a selective approach to gaining knowledge during courses (as a result, they can manage their learning process and development better in a selected direction),
- final year students who think of their future on the labour market and prepare for it, are clever, active, and open-minded,
- people who think of establishing a business and are enterprising,
- the unemployed who are afraid of self-employment,
- secondary school students, to focus them on professional courses and prepare for business future,
- students of technical secondary and vocational schools – to prepare them to enter the labour market, and
- primary school pupils – to teach them logics.

Nevertheless, it is worth mentioning that the case study method requires genuine commitment and cannot be applied thoughtlessly. Therefore, trainees at courses taught with this method should be aware how much its effects depend on themselves, i.e. their dedication, work, knowledge as well as earlier experiences. Hence, one should be conscious that the higher advancement of the group in terms of its knowledge, ability to discuss, life and professional experience, the deeper effects of the case study training will be in the given discipline. In general, one should always ask a question about the level represented by the group, to adapt the skills of the teacher and the applied methods and techniques.

That is why at the undermediate level (bachelor, master, and doctoral students) classes will have a quite technical character, evolving next to functional cases.

The use of case method at different levels will require a different approach to the audience and teaching techniques. The programme for experienced executives should be taught by a professional and experienced teacher. J.C. Vázquez-Dodero, the expert in case method, indicates the simple, but important rule: 'the more experienced and mature the audience is, the more mature and experienced the instructor should be'. He also recognizes the relation between the academic focus and the superiority of a mentor[16].

[15] Partial report on the Case Simulator project evaluation, 18 December 2012.

[16] J.C. Vázquez-Dodero, *The Case: the Instructor…*, p. 14.

Case Study method in the eyes of its users – SWOT analysis

The case study method was applied during the Case Simulator project testing stage at Gdańsk University from October 2012 to February 2013. In total, 165 students from different faculties of the University and 11 trainers were involved in teaching with the case study method. The trainees worked based on specially prepared case studies, while the trainers had undergone instructions in the method application. Direct interviews were carried out with the trainees to find the strengths and weaknesses as well as opportunities and threats[17] related to the case study method. The results of the questionnaire concerning the perception of the method have been presented in Table 5. It is worth mentioning that respondents were not suggested any answers and they did not fill in a questionnaire. Therefore, the responses were based exclusively on the own assessment and observations by the trainees.

Strengths of the case study method include the positive structural elements and advantages in developing skills of the trainees that may be used while competing on the market. Strengths that dominated the structure of responses included the development of critical thinking among the trainees, the ability to remember, teamwork, generating motivation, decision taking and problem solving skills. Other strengths of the method included its innovation (the questionnaire was conducted among students of the Polish university). Respondents claimed that the case study was an innovative solution that contributed a new quality to the curriculum of the University. The basis of the method is the new way of transmitting knowledge, which is much more involving and attractive than traditional methods, thus simplifying the reception of transferred content. Another stressed element was the necessity to prepare for classes thoroughly, which reinforces the effects of study, while deep involvement contributes to motivation. Learning through solving real problems increases the ability to apply solutions developed in the course of study in similar business contexts. Users noticed that they could face problems that are associated with establishing a business, real problems that occur during its operation and that case studies concerned 'unexpected' situations where difficult ethical problems had to be resolved. Case studies are generally analysed in small groups, which gives an opportunity to discuss and learn different points of view, thus facilitating interactive communication between a teacher and students. Other strengths included learning with well-prepared materials, which are based comprehensively on business man-

[17] Such elements are included in the SWOT analysis (*strengths-weaknesses-opportunities-threats*). SWOT is among the most popular methods of strategic analysis. It involves making a list of analysed factors in a four-field matrix with the division into external and internal factors and positive and negative elements.

agement and stimulate to read next parts. The diversified content of tasks and instructions require a critical and analytical approach to a problem.

Weaknesses are the negative internal characteristics of the analysed method. They are to be minimised in order to maintain the effective use of case studies. A statement that is worth mentioning was that the difficulty level of case studies was relatively low compared to the complexity of real business problems. It suggests that it is necessary to adapt the difficulty level of discussed case studies to the advancement of a group, which is consistent with the premise of adapting the method in the teaching process to the capacities of economists and non-economists. This conclusion is confirmed in the next sentence: 'the difficulty level should be diversified for different levels; perhaps cases prepared for students of economics could be more difficult, while those for students of other courses easier'. Another fact that was commented on was that the method was used to verify and reinforce acquired knowledge rather than to teach new problems, which again is a part of the case study methodology that generally provides for the use of knowledge and experience one already has and enriching it with new elements through a problem analysis. Trainees on a beginner level may feel overburdened with case studies that are designed for more advanced students, and vice versa – better users may be discouraged if tasks are too simple. Understanding a case study often requires extra sources of knowledge to be used. Trainees noticed that it was necessary to prepare interesting and attractive cases.

Table 5. Characteristics of the case study method in the eyes of its users – SWOT matrix

STRENGTHS
+ a case study develops the skills of critical thinking, + remembering is made easier owing to the use of examples, + a case study requires the involvement of the whole group, + a case study method develops teamwork skills, + as classes progress, the self-confidence and willingness to speak and share one's experiences grow, + easy reception of content, + deep involvement in the study contributes to developing motivation, + the necessity to prepare to classes reinforces the effects of study, + interactive communication between a teacher and students, + working in a small group gives an opportunity to discuss and learn different points of view, + one can learn how to take decisions, + an innovative approach, + a new method of transferring knowledge, which is much more attractive and involving than traditional methods, + an unconventional approach to students, + learning through the resolution of specific problems increases the possibility to apply solutions developed during the study in similar business situations, + a comprehensive approach to business management, + raising actual problems that result from business operation, + an opportunity to analyse cases that involve unexpected stories, where a difficult ethical problem is to be resolved, + a chance to face problems involved in establishing a firm, + a case study is an innovative solution that brings new quality into the curriculum offer of the University, + an opportunity to learn with well-prepared materials, + interesting case studies that stimulate students to read next cases, + prepared materials prove very effective, as they present business management in a comprehensive manner, + a case study structure: interesting stories, a well-prepared glossary, and + varied content of instructions and tasks.
WEAKNESSES
– a sector described in a case study is sometimes not interesting for students, – a complexity level of a case study is relatively low compared to the complexity of real business problems, – a method used more to verify and reinforce gained knowledge rather than to teach new topics, – it requires preparation for classes, which is not always welcomed by students, – a case study requires the involvement of the whole group, – classes may be lengthy and tiring, – the difficulty should be varied according to different levels; case studies prepared for students of economics could be more difficult than those for non-economists, – the necessity to prepare interesting and attractive examples, and – little information on establishing a business in terms of legal requirements – what documents have to be submitted and where, forms of tax accounts, advantages and disadvantages of each form

OPPORTUNITIES
+ deep involvement of trainees inspires creativity and formulating various interesting ideas compared to traditional methods, + the method is often used in recruitment to verify the skills of a potential candidate, + the method is well-known and recognised abroad, + the teaching method is preferred by students, + a number of subjects would be more interesting if taught with this method, + an opportunity to develop one's creativity, + a chance to analyse a large number of unconventional situations, + preparing even more surprising case studies, + analysing a problem to find a solution, not necessarily related to risk, but rather to human behaviour, which enables to prove oneself in typical and unusual situations, + a chance to become bolder in negotiations, when a position has to be developed alone or in a group, and + introducing case studies as an element of lectures and classes, which will enrich the programme even more.
THREATS
– set forms of teaching applied at universities in Poland form a barrier for the development of this method in our country, – students lack the proper understating of this method, which may reduce its effectiveness (students may fail to perceive the necessity to prepare for classes), – a key to efficiency of the method is a good instructor who can lead and moderate a discussion well (if a moderator cannot lead a group, classes may end in chaos and it would be difficult to gain any benefits from such a situation), – a difficult learning method for introverts, and – a case study should not replace traditional forms of teaching (it may be a supplement, at best).

Source: Own study based on responses of students participating in the Case Simulator project at Gdańsk University from October 2012 to February 2013. Responses prepared on 12–15 March 2013.

The role of an instructor is important there – a person who should select cases and moderate the discussion so that the most sensitive problems are touched. Otherwise, a case study class may prove lengthy and tiring. Finally, the preparation of trainees for classes was discussed. This requirement may not be always welcomed by students, but the effective case study always requires the involvement of the whole group.

Opportunities belong to external factors that affect the possibilities of using the case study method effectively and constitute chances that occur in the market environment and may be used to increase the efficiency. Therefore, it was stressed that the method is well-known and recognised abroad, which may distinguish the universities that apply it. The method is also appreciated by students who indicate it as a preferred method of learning that could be applied as a teaching element both in lectures and classes. It was ascertained that the involvement of trainees provided greater creativity and the formulation of various interesting ideas compared to traditional teaching methods.

The identified opportunities included a chance to develop one's creativity and negotiation skills as one has to express one's opinion. Moreover, respondents noticed that it exercised behaviour in unusual situations that were difficult in ethical terms. An opportunity stemming from this method is an analysis of a large number of unconventional situations related, for example, with human behaviour. Students recognised that the method could be useful in recruitment processes in order to verify the skills of a potential candidate, which on the other hand can make students feel more comfortable in the recruitment context in the future.

Threats describe elements of external environment that have a negative impact. Such elements may include set forms of teaching applied at universities in Poland, which create a barrier for the development of this method in our country. According to another respondent, the method may be difficult for introverts, which corresponds to the above-mentioned development opportunities thanks to case studies. Moreover, the efficiency of the method may be threatened by the behaviour of users, for example, if students fail to understand the method or the necessity to prepare for classes, which confirms the existence of behaviour that has been developed in the course of traditional studies. Other threats include the inability or unwillingness to work in a group. The role of an instructor was also noticed, which has to be considered seriously in the context of the applied method. A good instructor knows how to manage and moderate a discussion.

Moreover, users of the case study method claim that work based on case studies should not replace traditional teaching forms, which require the acquisition of theoretic knowledge, but should supplement them. As a result, it may provide the practical application of knowledge and skills. According to authors, the results of the study confirm the efficiency of the applied method in developing the characteristics and skills of entrepreneurs.

Conclusion

The conditionings of the case study method include: defining a level of a target group, a proper selection of a difficulty level, a suitable choice and preparation of an instructor, in-depth preparation and involvement of trainees. Work based on case studies should not replace traditional forms of teaching, which require the acquisition of theoretical knowledge, but should supplement them. As a result, it may provide the practical application of knowledge and skills as well as raising the level of knowledge, competences, and experience according to the case study methodology. The method is recommended for developing decision-taking skills and drawing conclusions, regardless of the area of activity.

Chapter 4

Advantages of using business simulations in education

Unique qualities of simulation-based teaching

The use of decision making simulation games in education derives from military training, whose aim was to teach the trainees with the skill of strategic reasoning. Games of this kind were used as early as in ancient times to find their way to Europe in the mid 20th century as part of the Prussian Army training[1]. Since the 1950s counselling companies and universities draw from their concept in entrepreneurship training at different levels of education.

Simulations also constitute one of different kinds of research tools of the experimental techniques group[2]. In market research, simulations are used to observe participants' behaviour and their reactions to stimuli generated by a simulation algorithm. Observations then lead to conclusions on the skills of acting in stressful conditions, problem solving, team work, etc. That is why simulation games can be applied to assess employees' competences, for instance[3].

Creating a virtual reflection of reality, simulations, also called decision making games, can naturally aid the process of teaching. Using properly designed algorithms, they enable practical comprehension of the functioning of the models with which students acquaint themselves during theoretical classes.

Well played, simulation games allow the participant to connect his or her own decisions with obtained results. Participants in a tournament are made to perform a regular analysis of their actions in a recurrent cycle, thus developing positive habits: right actions are rewarded with a positive result, wrong ones are

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[1] M. Wawrzeńczyk-Kulik, *Symulacyjna gra decyzyjna jako narzędzie wspomagające nauczanie w ramach przedmiotu „Podstawy przedsiębiorczości"*, Zeszyty Naukowe WSEI, series: Ekonomia, 2013, No. 6, p. 305.

[2] Cf. S. Kaczmarczyk, *Badania marketingowe. Podstawy metodyczne*, PWE, Warszawa 2011, pp. 355–360.

[3] Cf. E. Miłosz, M. Miłosz, *Symulatory systemów gospodarczych w kształceniu menedżerów, Komputer w edukacji*, Wydawnictwo Leopoldinum Fundacji dla Uniwersytetu Wrocławskiego, 1995, No. 3–4, pp. 83–91.

punished with a negative result. The observation of a success and failure source in the simulated world leads to the shaping of behaviour patterns in the real world. Learning how to distinguish facts and results derived from the simulation model used from personal convictions is another big advantage.

Creating a simulation requires a commitment from a number of people. In order to for a substantive backbone of the simulation to be developed, a team of specialists has to be established. The will help describe the processes that will form the basis for the simulation algorithms. These algorithms will be developed by a technical team – artists, graphic designers and software engineers. The composition of this team will vary depending on the kind of simulation designed. Testers will also be needed to pick up technical or logical errors. Their work makes it possible to improve playability of the simulation. The last indispensable group is that of trainers – persons responsible for applying the simulation in the teaching process. Although not all of these teams have to cooperate with one another closely, thorough understanding of the rationale and goals of the simulation is vital for benefiting from a tool developed this way.

Simulation games are usually played in teams of a few players. Depending on how complex a given simulation is, i.e. on the scope of decisions to be made by the player at each consecutive stage, the number of players may range from 5 to 30. That, of course, does not apply to dispersed simulations that use Internet platforms, as is the case with Global Management Challenge. This international tournament has been held for over 30 years now, with over 450 thousand players involved throughout this period[4]. A round played in groups enables participants to benefit from the advantages of the simulation to a greater extent; not only do they learn how to solve problems practically, but also how to work in team – with dependence on others, division of responsibilities or persuading others.

Games are run in rounds, which means that the participant are allocated a certain amount of time to make a decision. A typical course of a round is shown in Figure 6.

It is only after all the teams have made their decisions that the game may continue. There are a few pros of this approach:

- it helps participants make measured judgements,
- it motivates participants to solve problems as a team,
- it imposes time limits making participants arrive at a solution within their confines,
- it enables participants to retreat from a bad decision providing the round is not over,
- it makes it possible to introduce participants to the subject matter of the simulation gradually,
- it makes it possible for trainers to broaden participants' knowledge through training and diversification of topics and challenges in different rounds.

[4] http://www.gmcpoland.pl/.

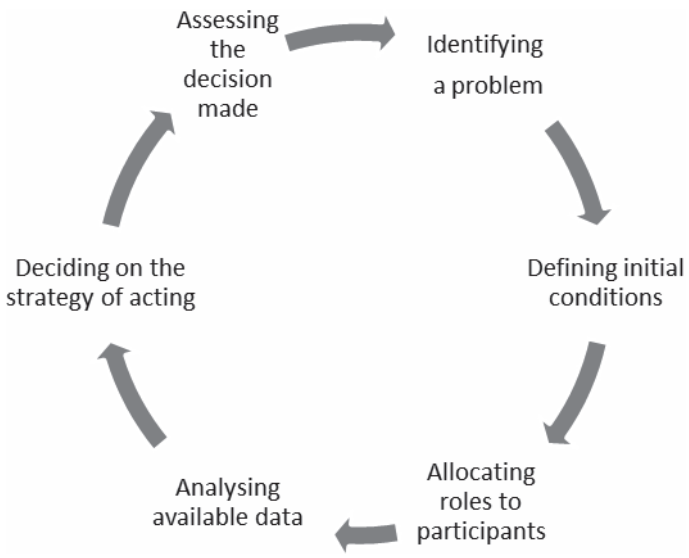

Figure 6. Course of decision making simulation game – example

Source: Own elaboration based on the lecture: E. Piotrowska, *Aktywizujące metody nauczania stosowane w kształceniu zawodowym*, Uniwersytet Wrocławski, 2009.

Forms of competing in decision making simulation games

Competition among the teams participating in simulation games is their crucial part. The teams often compete having only limited resources. This means that one team's success comes at a cost to others. Competition of this kind strengthens ties within teams and guarantees the participants' commitment to the game. Due to their nature, simulations are used in different competitions whose aim is to select the most entrepreneurial or foreseeing participants or those who solve problems most efficiently.

Competition among teams may occur in various situations[5]:

- conflict situation with a conflict of interest,
- conflict free situation,
- cooperation and agreement on the ultimate goal,
- mixed situations – combinations of the above.

In the first of these situations the competing teams are engaged in a game in which limited resources have to be divided among them. This can happen, for instance, when the participants are to offer similar benefits within the same mar-

[5] B. Wit, *Formy rywalizacji stron w symulacyjnych grach decyzyjnych*, http://dyd.pol.lublin.pl/users/wit/pan/formy.html.

ket, splitting up one group of purchasers. The conflict-provoking goal consists in each side aspiring to maximise its market share or another parameter decided upon in advance, which describes predominance of one of the simulated enterprises over the other.

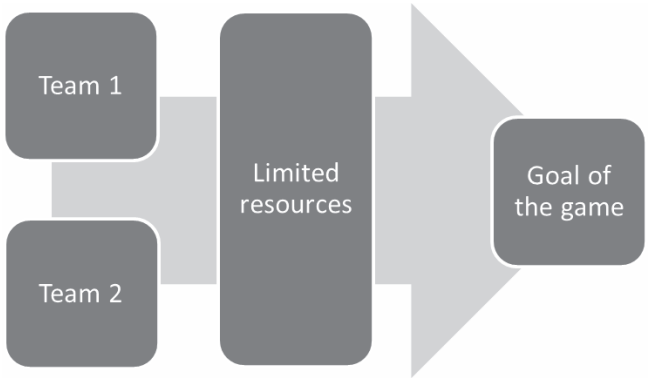

Figure 7. Game in a conflict provoking setting

Source: Own elaboration.

In the case with games which do not provoke a conflict situation, the participating teams do not compete against one another but focus on overcoming independent obstacles following from the game script. Disasters that impact manufacturing capacity, seasons of the year and seasonality of purchases are just some examples of such obstacles. A game played in a conflict free situation is illustrated in Figure 8.

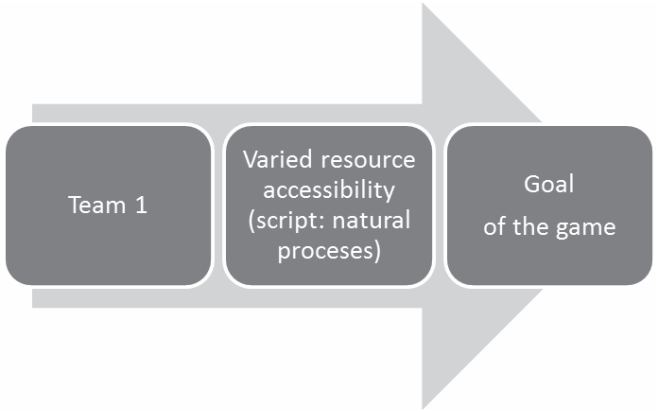

Figure 8. Game in a conflict free setting

Source: Own elaboration.

Games intended to encourage players' cooperation are often used as a component of integration training sessions, which promote team building. Such teams generally formulate different partial objectives, and specialise in performing particular functions as defined in the game. They can be teams of, for instance, financiers, marketers, logistics specialists, merchants or strategists. Competences of each team contribute to attaining the ultimate goal set for the game.

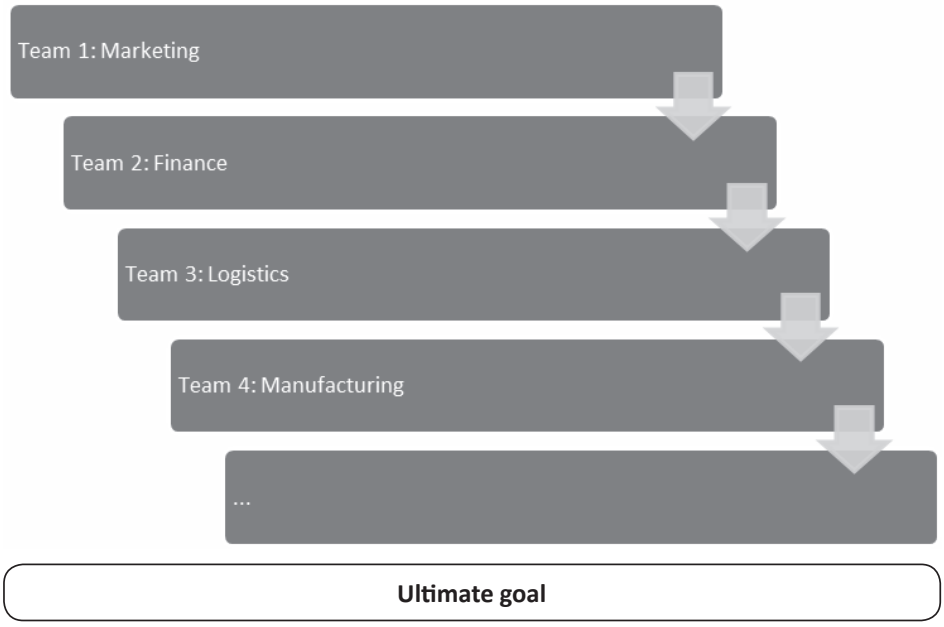

Figure 9. Cooperation-oriented game

Source: Own elaboration.

The games available in the market do not really offer pure forms of competing. These are usually complex – e.g. competitive sale of the same service on one market (i.e. to one, limited customer group) will be hampered by natural and real processes such as progression of seasons or changes in fashion.

Types of simulations used in education

W. Biggs distinguishes the following types of business simulation games[6]:

– games simulating operations of a whole enterprises or just its selected functions,

[6] M. Wawrzeńczyk-Kulik, *Symulacyjna gra decyzyjna…*, pp. 306–307.

- games in which participants compete against one another or cooperate,
- interactive and non-interactive games,
- games related to a particular industry or to entrepreneurship in general,
- games in which competing concerns individual players or entire teams,
- games based on the deterministic or the stochastic model,
- games whose scripts follows from a mathematical model of player's own decisions

Simulations offered by higher education facilities usually take one of the following forms:

- paper form simulations, resembling board games; so-called decision sheets are used to record players' decisions. Simulation script is coordinated by a master of the game – an expert who assesses the decisions made.
- computer aided simulations – both those using dedicated single-user-mode applications and those using Internet based solutions. The master's role is taken over by an algorithm assessing decision efficiency. A trainer can take two roles in this case: an expert supporting teams throughout the decision making process and a technical advisor introducing players to interface and software functionalities and managing the game.
- spreadsheet based decision making games – an intermediate form between paper- and computer games. Although they apply computer technology, they limit it to recording decisions in a spreadsheet in place of decision sheet in a paper form. Sheets filled out this way are submitted to the expert who manages the game for him or her to assess them.

Main advantages of paper form simulations include a low cost of preparing and conducting classes based on them as well as transparency of the decision making process. As remote teaching is not possible in this mode, the game leader has a chance of observing the players' mutual relations. The necessity to rely on an expert's knowledge in evaluating participants' achievements is a drawback to this setup.

In IT-technology dependent games the role of an expert is limited to designing the indispensable algorithm, and is used later *a la carte* as a source of knowledge in the course of the training given. This combination of traditional teaching with methods comparable to e-learning is called blended-learning. Its basic rules require[7]:

- sensible integration of traditional and on-line teaching,
- thorough revision of the subject syllabus in order to optimise the student's involvement,
- change of structure and places during a traditional exchange.

Simulations offered on the market vary also in terms of subject matter. From those focusing on time planning, team management, carrying out particular ac-

[7] H. Marjak, *Ekonomiczne gry symulacyjne w środowisku wirtualnym*, "Oeconomica" Pomeranian University of Technology, Szczecin 2009, No. 273, p. 124

tivities pertaining to selected domains through to broadly defined market- and competitive environment simulations, in the course of which players need to develop and run businesses in a particular industry. Needless to say, simulations for teaching entrepreneurship differ greatly from those used at medical universities. The Education and Medical Simulation Centre of Medical University of Silesia in Katowice offers six simulation rooms (operating theatre, intensive care unit, emergency room, paediatric room and labour room) and classrooms. The Centre has been fitted out with state-of-the-art patient simulators, enabling students to acquire and improve manual skills, which are recorded and evaluated during the so-called debriefing sessions[8].

Applying business simulations as teaching tools in higher education

This elaboration inspired an analysis of web sites of Polish higher education facilities which educate students of business specialties. The table below lists of such centres whose programmes offer activities benefitting from decision making business simulations[9].

Table 6. Decision making business simulations used at higher education facilities

University	Simulation
AGH University of Science and Technology	Global Management Challenge Marketplace
Jan Długosz University in Częstochowa	Global Management Challenge
Kozminski University	Global Management Challenge Marketplace
Gdynia Maritime University	Global Management Challenge
University of Podlasie	Global Management Challenge
Polonia University in Częstochowa	Marketplace
University of Bielsko-Biala	Global Management Challenge
Józef Tyszkiewicz College of Business and Computer Science	Marketplace
Katowice School of Economics	Global Management Challenge
John Paul II Catholic University of Lublin	Global Management Challenge
Małopolska School of Economics, Tarnow	Global Management Challenge
International Management Center, University of Warsaw	Global Management Challenge

[8] http://cdism.sum.edu.pl/Symulacja/symulacja.aspx.

[9] The nature of the data collected is dynamic – each new semester may see simulations enter new universities; by the same token, new games may be used at the universities from the list.

University	Simulation
Romuald Kudlinski OLYMPUS University	Global Management Challenge
State Higher School of Computer Science and Business Administration in Lomza	Global Management Challenge
Pope John II State School of Higher Education in Biała Podlaska	Global Management Challenge
Public Professional College in Gorzów Wielkopolski	Global Management Challenge
Stanisław Wojciechowski Higher Vocational State School in Kalisz (academic education)	Global Management Challenge
School of Higher Vocational Education in Nysa	Global Management Challenge
Higher Vocational School in Suwalki	Global Management Challenge
Bialystok University of Technology	Global Management Challenge Marketplace
Czestochowa University of Technology	Global Management Challenge
Gdańsk University of Technology	Global Management Challenge Marketplace
Koszalin University of Technology	Global Management Challenge
Tadeusz Kościuszko Cracow University of Technology	Global Management Challenge
Lublin University of Technology	Global Management Challenge Marketplace
Lodz University of Technology	Global Management Challenge
Poznan University of Technology	Global Management Challenge Marketplace
Kazimierz Pulaski University of Technology and Humanities in Radom	Marketplace
Rzeszow University of Technology	Global Management Challenge Marketplace
Silesian University of Technology	Global Management Challenge
Kielce University of Technology	Global Management Challenge
Warsaw University of Technology	Global Management Challenge Marketplace
Wrocław University of Technology	Global Management Challenge
Polish Virtual University	Marketplace
Polish-Japanese Institute of Information Technology	Global Management Challenge
Warsaw University of Technology Business School	Global Management Challenge
Warsaw University of Life Sciences – SGGW	Global Management Challenge
Warsaw School of Economics	Global Management Challenge Marketplace
Bogdan Jański Academy	Global Management Challenge
University of Social Sciences and Humanities	Global Management Challenge
Silesian International Business School	Global Management Challenge
Bolesław Markowski Higher School of Commerce in Kielce	Decision making simulation TEES-6

University	Simulation
Lazarski Univeristy	Global Management Challenge
Adam Mickiewicz University, Poznań	Global Management Challenge Marketplace
University of Economics in Katowice	Global Management Challenge Decision making simulation TEES-6
Cracow University of Economics	Global Management Challenge Marketplace Decision making simulation TEES-6
Poznan University of Economics	Global Management Challenge Marketplace
Wrocław University of Economics	Global Management Challenge Marketplace PROMAR
University of Gdańsk	CaseSimulator Global Management Challenge Industry Masters Strategic Market Simulation 4RMR
Jan Kochanowski University in Kielce	Global Management Challenge
Jagiellonian University in Krakow	Global Management Challenge
Kazimierz Wielki University	Global Management Challenge
University of Lodz	Global Management Challenge Internet decision making game TAKTYK Marketplace
Maria Curie-Skłodowska University	Global Management Challenge
Medical University of Lublin	Global Management Challenge
Nicolaus Copernicus University	Global Management Challenge Industry Masters
University of Rzeszów	Global Management Challenge
Szczecin University	Global Management Challenge Marketplace Decision making simulation TEES-6
University of Silesia	Global Management Challenge
University of Bialystok	Global Management Challenge Marketplace
University of Warmia and Mazury in Olsztyn	Global Management Challenge
University of Warsaw	Global Management Challenge
University of Wrocław	Global Management Challenge
University of Zielona Góra	Global Management Challenge
Military University of Technology, Warsaw	Global Management Challenge

University	Simulation
Zamosc University of Management and Administration	TOPSIM
Bydgoszcz School of Banking	Global Management Challenge
Poznan School of Banking	Global Management Challenge Marketplace
Wroclaw School of Banking	Global Management Challenge
Wyższa Szkoła Biznesu – National Louis University w Nowym Sączu	Global Management Challenge Marketplace
Higher School of Economics and Social Sciences in Bydgoszcz	Global Management Challenge
Tischner European University, Cracow	Chłopska Szkoła Biznesu Global Management Challenge
University of Finance and Management, Białystok	Marketplace
University of Economy in Bydgoszcz	Global Management Challenge
Skarbek University in Warsaw	Global Management Challenge
Lazarski University	Marketplace
University of Humanities and Economics in Lodz	Global Management Challenge
University of Information Technology and Management in Rzeszow	ComStrat Global Management Challenge Marketplace
University of Computer Sciences and Skills in Łódź	Marketplace
College of Foreign Languages and Economy in Częstochowa	Marketplace
College of Communications and Management – CCM in Pozan	Global Management Challenge
University of Trade, Zgierz	Global Management Challenge
Warsaw Management Academy	Marketplace
Karol Godula Upper Silesian Academy of Entrepreneurship in Chorzów	Global Management Challenge
Warsaw Academy of Insurance and Banking	Global Management Challenge
University of Management and Administration in Zamosc	Global Management Challenge Marketplace
School of Banking and Management, Cracow	Global Management Challenge Marketplace
Chodkowska University, Warsaw	Global Management Challenge
Polish Open University – Wyższa Szkoła Zarządzania	Global Management Challenge Marketplace
The West Pomeranian Business School	Global Management Challenge Marketplace
West Pomeranian University of Technology, Szczecin	Global Management Challenge SGE Strateg

Source: Own elaboration.

The list comprises 91 academic centres. It is worth emphasising that it is not only schools of economics but also those specialising in science and humanities that use business simulations as a tool for teaching entrepreneurship. The following decision making games were used in the institutions under analysis:

Polish games:
- Case Simulator
- Chłopska Szkoła Biznesu (*Rustic Business School)*
- ComStrat
- Internet decision making game TAKTYK
- PROMAR
- SGE Strateg
- Strategic Market Simulation 4RMR
- Decision making simulation TEES-6.

Foreign games:
- Global Management Challenge
- Industry Masters
- Marketplace
- TOPSIM.

The Marketplace, used at 32 higher education facilities, and the Decision making simulation TEES-6 (in 4 of the schools under analysis) ranked among the most popular games. Implemented in the form of an international tournament, also the Global Management Challenge has been used, quite untypically, for developing or testing entrepreneurial skills. In 2012, 80 higher education facilities participated in this tournament.

Among leading higher education centres that use simulations in the process of educating, the following ones stand out:
- University of Gdańsk, where students use 4 types of business simulations
- University of Information Technology and Management in Rzeszow (3 simulations)
- Szczecin University (3 simulations)
- University of Lodz (3 simulations)
- Wrocław University of Economics (3 simulations)
- Cracow University of Economics (3 simulations).

Recapitulation

Application of business simulation games in teaching entrepreneurship offers calculable advantages of combining economic and management theory and practice. Using computer based solutions, students can compete both during conventional classes and within the e-learning environment. Majority of Polish higher education facilities apply foreign solutions – the Marketplace and Global Management

Challenge games. However, it is worth emphasising that higher education facilities encourage the development of Polish tools as well. Among the earliest on those is the TEES simulation – on the market since 1996, and the Strategic Market Simulation 4RMR, used at higher education facilities since 2002.

Participants' commitment, acquisition of entrepreneurial skills in a simulated environment and the possibility of enriching the courses with elements of theory make it likely that this mode of teaching will keep spreading across higher education facilities in the years to come. Solutions of different difficulty levels can be expected to emerge, which will aid education from the secondary level through to specialist postgraduate courses.

Chapter 5

Business simulation architecture design process

Problem situation

The objective of innovative teaching tools is to perform the educational process as effectively as possible. In the area of economics and management, an important aspect is to deliver education in the context that is as close to the real one as possible, taking into account the dynamically changing environment. It follows the expectations of the very popular **constructivist approach to teaching**, where according to Y.B. Kafai and M. Resnik trainees are actively involved in constructing and reconstructing acquired knowledge and experience in the real world[1].

The development of IT technologies and network learning have given access to designing realistic teaching environments that are similar to real ones, involve students and increase satisfaction with the extension of competences. In combination with communication tools and a mature approach to education as a case study, the construction of mixed environments becomes available[2], which is characterised by high interactivity and learner-centred e-learning (LCeL)[3]. In this regard the just demand of Dokeos e-learning Architects is to be accepted for **competence-oriented teaching**, which is to replace teaching focused on the content of curriculum material[4]. G. Fleet, D. Downes, and L. Johnson indicate

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[1] Y.B. Kafai, M. Resnik, *Perspectives in Constructivism*, Y.B. Kafai, M. Resnik (ed.) *Constructivism in Practise, Designing, Thinking an Learning in a Digital World*, Lawrence Erlbaum Associates, Mahwah 1996, p. 2.

[2] Mixed environments apply, in addition to traditional teaching methods such as lectures and classes, other most common network educational methods, for example e-learning. C.J. Bonk, C. Graham (eds.), *The Handbook of Blended Learning: Global Perspectives, Local Designs*, Wiley, San Francisco 2006, p. 114.

[3] LCeL means orienting training on the development of trainee competences, instead of content of teaching material.

[4] Dokeos e-learning Architects, *The Dokeos e-learning project management guide*, http://www.dokeos.com/doc/DokeosElearningProjectManagementGuide.pdf, 2010.

that the benefits from LCeL include the higher probability of achieving the set effects of study[5].

Simulations fulfil the above-mentioned requirements successfully[6], focusing on the transfer of knowledge in laboratory conditions into real problem situations. In case of problems in economics and management, business simulations are considered to be a very useful tool[7]. They make it possible to act in the environment that is similar to the real one, which provides the higher efficiency of learning compared to the exclusively traditional task solution. This is possible owing to the **positive impact of business simulations** indicated by S. Robinson on[8]:

- the ability to take actions without risk, where the performance of similar operations in a real enterprise is impossible due to the economic effects and temporal aspects;
- developing new knowledge and understanding of occurring processes owing to the capacity to analyse ongoing transformations;
- knowledge visualizations and communication, where simulations facilitate the transfer and understanding of issues as well as the practical application of theory; and
- building consensus owing to feedback that highlights the achieved benefits during the verification of different action scenarios.

To achieve the above-mentioned purposes, according to D. Gibson, C. Aldrich and M. Presky, simulations cannot be dedicated to entertainment, with its unwanted triumph of form over content[9]. In the course of designing a teaching environment, one has to consider a number of aspects, both theoretical and practical ones. This complex issue requires conceptualizations and simulation designing that takes account of a huge number of variables and limitations that occur in reality[10]. In this regard, E. Kirkley and J.R. Kirkley distinguish a model of **teaching environment designing factors**, where the following are to be considered as key aspects: the need and the related teaching intention, physical and virtual spaces of performance, actions and interactions. They also indicate the necessity of further exploration for broadening these aspects[11].

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[5] G. Fleet, D. Downes, L. Johnson, *A New Approach to E-Learning: The Learner-Center E-Learning (LCeL) Group*, E. Norlin, T. Travis (eds.), *E-learning and Business Plans: National and International Case Studies*, ScareCrow Press, Playmouth 2008, pp. 173–185.

[6] Simulations are also referred to as online games and educational online games: L. Galarneau, M. Zibit, *Online Games for 21st Century Skills*, Information Science Publishing, London 2007, p. 61.

[7] J. Banks, J.S. Carson, B.L. Nelson, *Discrete-Event System Simulation*, 2nd edn, Upper Saddle River 1996.

[8] S. Robinson, *Simulation*: *The Practise of Model Development and Use*, Wiley, Chichester 2004, p. 10.

[9] D. Gibson, C. Aldrich, M. Presky, *Games And Simulations in Online Learning: Research And Development Frameworks*, Information Science Publishing, London 2007, p. 9.

[10] E. Kirkley, J.R. Kirkley, *Creating next generation blended learning environments using mixed reality, Video Games and Simulations*, "TechTrends" 2005, Vol. 49, No. 3, p. 43.

[11] Ibidem, p. 43.

As regards the above-mentioned factors of teaching environment design, it is to be indicated according to E. Kirkley and J.R. Kirkley what **areas of business simulation designing** have to be taken into consideration:[12]

- theoretic bases in designing teaching manuals, the preparation and management of product, i.e. the simulation-based teaching environment;
- the possibilities and limitations of technologies applied to develop simulations / virtual teaching environment (*Virtual Learning Environment*, VLE)[13];
- strategies and approaches to prepare teaching instructions; and
- the process of designing teaching instructions and tools required for the effective application of technology for strategies and tactics according to a theoretic approach.

According to the presented factors of simulation environment designing, pedagogic aspects should be taken into consideration with the focus on the constructivist approach to teaching[14], as well as technological and learner-oriented aspects, rather than the teaching material. Moreover, L. Galarneau and M. Zibit point out the role of developing the '**21st century skills**' with online games, such as critical thinking, teamwork, problem resolution, cooperation, free use of information and communication technologies (ICT), and the ability to gain information quickly[15]. The conditionings of developing simulations have to be also considered, such as major financial and temporal outlays required for their preparation, the necessity to obtain a large volume of data, preparing models, access to expert knowledge and providing the correctness of generated results[16]. In this context, designing and developing a suitable simulation environment is to be considered as highly complex and requiring the application of a proper approach to implementation.

The analysis of the business simulation preparation has been carried out by A. Greasley, who prepared the relevant **division of mathematical models** presented in Figure 10.

With reference to Figure 10, business simulations should definitely be attributed to dynamic mathematical models, where it is possible to change model attributes in time. Such models can be developed as analytical solutions but need to have the form of a simulation. Moreover, depending on the type of simulation, they may implement **a form of changes that are:**

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[12] Ibidem, p. 43.

[13] The virtual environment according to P. Brett is 'a tool that supports the educational process of individuals and whole groups based on access to resources such as texts and multimedia, assessing the achieved teaching objectives with tests and supporting the communication of education with asynchronic and synchronic communication tools', P. Brett, *Staff Using an Institution-Wide VLE for Blended E-Learning: Implications of Student Views*, J. O'Donoghue (ed.), *Technology Supported Learning and Teaching: a Staff Perspective*, Information Science Publishing, Hershey 2006, p. 162.

[14] J. Jowati, *Simulation and learning theories,* http://www.thefreelibrary.com/Simulation+and+learning+theories.-a0159921072, 22 December 2006.

[15] L. Galarneau i Zibit, *Online Games for 21st Century Skills*, Information Science Publishing, London 2007, p. 61.

[16] S. Robinson, *Simulation*: *The Practise…*, pp. 10–11.

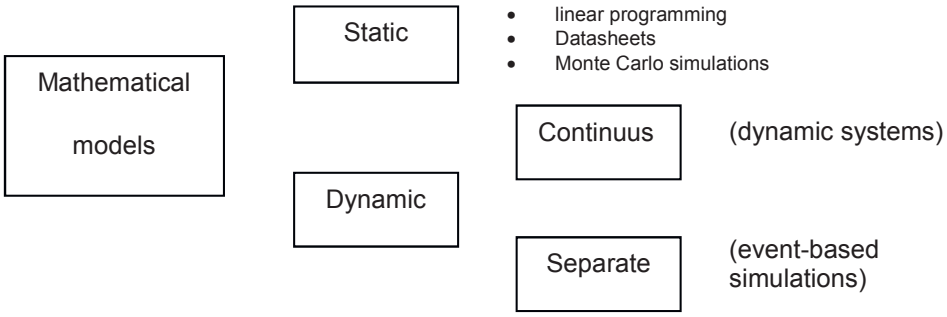


Figure 10. Categories of mathematical models

Source: A. Greasley, *Simulation Modelling for Business*, Aahgate Publishing Limited, Aldershot 2004, p. 12.

– continuous, e.g. the automatic fulfilment of orders in the simulation of an e-shop, where the number of waiting customers keeps changing; or
– discreet and occur in separate (i.e. non-continuous) points in time, e.g. in the simulation of running a business the change of VAT rate at the beginning of the year resulting from a new law.

In many cases a simulation encompasses both types of changes, e.g. a production firm where stocks of components change continuously, and the offer of manufactured products is modified based on events.

The literature provides **approaches and notations**, such as STELLA II[17] AND 3-Phase, for designing simulation model algorithms. As business simulations are often event-based, the 3-Phase system is to be considered as a particularly useful method of simulation designing, where 3 phases occur in turn: the move to the next temporal event, performing activities related to an event, and taking actions that depend on the occurrence of events in phases A and B.

Practical experience resulting from the participation in a number of projects involving simulation[18] indicates the excessive focus in the course of designing IT tools on reflecting the reality and the quality of algorithms with regard to the efficiency of studying and the adaptability of teaching environment. A developed simulation has to win over its receivers not just to the quality of production and comfort of application but, as stressed by S. Robinson, to the usefulness in developing competences and their subsequent connection with actual problem situations[19]. Therefore, developing simulations that stimulate learning effectively requires more than the preparation of software. What is necessary is the ability to develop a conceptual model, a correctness validation system and

[17] To see more: http://www.iseesystems.com/softwares/Education/StellaSoftware.aspx [access: 15.03.2013].

[18] Related to the performance of a number of IT training based on the virtual laboratory environment of Microsoft company and the involvement in projects of business simulation application such as Case Simulator (http://casesimulator.pl/).

[19] S. Robinson, *Simulation*: *The Practise…*, p. 10.

the performance statistics, i.e. **the suitable conduct of the process of designing** an educational tool[20].

The opinion of S. Robinson is to be extended with the preparation of statistics in the form of useful feedback that enables to understand fully the achieved results as well as the conduct of processes and to take rational decisions based on the necessary information. The analysis conducted during the participation in projects that use simulations broadly in education indicates that **such important components** are often missing in many simulations, combined with other shortcomings:

- no detailed reporting modules that provide data on achieved results as well as a broad spectrum of feedback that justifies the reasons for obtaining them and facilitating the determination of any committed errors;
- a deficit of analytic tools that should provide comprehensive information that would be available in similar real business situations and would make it possible to take reasonable decisions;
- a static environment where game parameters are not adapted or are adapted not quickly enough to the changing environment in order to reflect the transformations of actual macroeconomic and microeconomic conditions;
- no option to set the complexity level in a simulation according to the context of skills that are to be gained by specific groups of trainees;
- insufficient communication support between members of simulation teams; and
- the failure to match applied technologies to present trends, as students with experience in social networking expect a high level of interaction with other persons and the constant access to the service via mobile devices.

Literature contains sufficient information on the methods of developing simulation algorithms and the general implementation of such projects; however, it often skips or discusses insufficiently the above-mentioned problems. Therefore, there is a need to **verify how important the indicated factors are** for the efficiency of studying and the participation in simulations, primarily in business ones. In combination with the practical experience, it is possible to formulate a **research hypothesis** that the method of implementing the process of designing the architecture of innovative teaching tools has a material impact on the efficiency of business simulations. The verification of this thesis has been carried out with relevant questionnaires and the results have been given in the next item of the chapter.

[20] Ibidem, p. 10.

Analysis of innovative teaching tool architecture designing requirements

To assess the importance of the above-mentioned factors in designing the business simulation application architecture, a questionnaire was administered to 170 participants of the Case Simulator project (http://casesimulator.pl). The initiative involved students from all the faculties of the Gdańsk University who worked in teams to set up and manage their business as a fitness club within the simulation. The questionnaire was aimed at indicating key solutions that should be included in business simulations together with the assessment of their weight in the processes of designing and producing simulation tools. Therefore, the respondents could determine the role of available and already applied elements as well as indicate any missing components indirectly. In this regard, a question was asked 'What do you think of the importance of integrating individual components in the architecture of the simulation tool in the efficiency of studying?' and **19 proposals were put forward divided into 7 areas**[21], giving also an option to add extra components:

I. Collective performance:
   1. Conducting the simulation in teams vs. alone.

II. Competition:
   1. General rankings of results achieved by individual participants or teams.
   2. Detailed statistics and rankings presenting results generated by individuals and teams, divided into the largest possible number of categories (e.g. income, profit, the number of customers, the number of products, and growth dynamics).

III. Availability:
   1. The availability of simulations for a number of platforms, including for mobile devices (PDAs, tablets, smartphones, other).

IV. Parametrization:
   1. The parametrization of the simulation play that affects the way of its performance (e.g. a difficulty level and the complexity of reality mapping).
   2. The dynamic adaptation of the simulation environment to changes that occur in the real environment (e.g. macroeconomic, such as changes of VAT rates).
   3. The occurrence of events where decisions taken may affect the further simulation (e.g. the course of processes).
   4. The occurrence of acts of god (e.g. the introduction of a law that imposes the requirement to obtain a license for operation).

[21] Proposals developed based on long-term experience of the author in using simulation systems in education and training industry.

5. The modularity of construction that makes it possible to connect and disconnect simulation components (e.g. extending the simulation with new areas to develop new competences and the simplification to take account only of key aspects).

V. Taking decisions:
   1. Reports that contain a broad spectrum of feedback that justifies the cause of obtaining results.
   2. Reports with a broad spectrum of feedback that indicates any committed errors.
   3. Analytical tools that refer comprehensive analogous data to real business situations, thus supporting the decision-making process.
   4. General information on simulation construction algorithms (e.g. indication which factors are crucial).
   5. Detailed information on simulation construction algorithms (e.g. giving action conduct patterns and mechanisms, which enables to calculate the results obtained for specific parameter values alone).

VI. Communication:
   1. Synchronic communication among simulation participants (chat, video-conference, audio-conference, a virtual class, and other).
   2. Asynchronic communication among simulation participants (a discussion forum, discussion groups, an internal e-mail system, messages, vote tools, and other).
   3. Social communication with simulation participants (blogs, vikis, webcasts, and other).

VII. Performance mode:
   1. The performance of a simulation in a mixed mode (e.g. in combination with case studies conducted in a traditional manner as workshops).

VIII. Other:
   1. Other important architecture components that should be taken into account in business simulations.

Respondents ranked the importance of integrating individual components into the simulation tool architecture for the effectiveness of studying in the following scale: very low, low, moderate, high or very high. The result analysis has enabled to identify key elements that should be taken into account in simulation development processes. The following formulae have been adopted as **the method of determining the role of individual elements**:

1. *Importance of an element* = (%very high + %high) – (%low + %very low)
2. *Element importance multiplier* = (%very high*2 + %high) – (%low + %very low*2)[22]

Figure 10 presents the results for specific questions. The data present the simulation architecture components arranged from the ones considered to be the most important to the ones of less significance. The boundary value is 0% – fac-

[22] The weight adopted for extreme answers in the importance assessment – very high or very low.

tors with higher values are to be deemed as important, while with lower values as less significant. In this regard, **the most important components** according to the questionnaire results (Figure 10) that should be taken into account in simulations include:

- implementations of simulations in a blended mode (e.g. in combination with case studies performed traditionally as workshops);
- teamwork vs. conducting simulations alone;
- preparing general and detailed rankings that present results achieved by individual participants or teams; and
- asynchronic communication among simulation participants, with synchronic communication attributed much less importance.

The above-mentioned results indicate explicitly that in order to perform a simulation effectively participants expect the **option to work in a team** supported with suitable communication tools. This is related also to the production of statistics and rankings that motivate through competition (Figure 11).

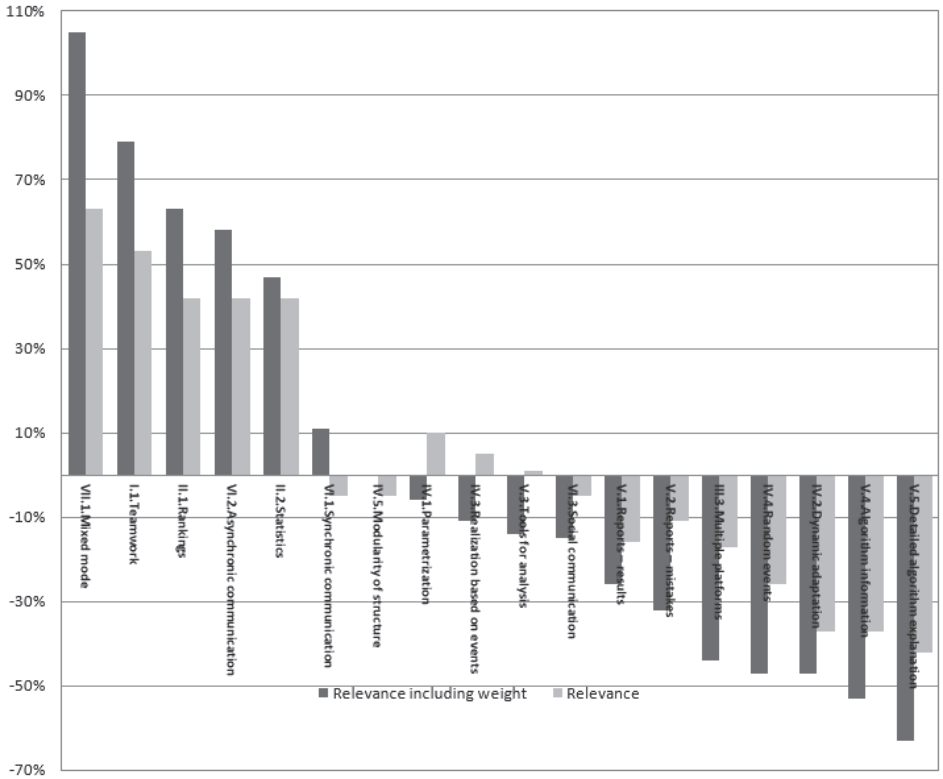


Figure 11. The relevance of integrating individual components in the simulation tool architecture to provide the efficiency of studying

Source: Own study.

Functionalities may be considered as **optional** if their high importance assessment corresponds to a low role assessment, i.e. the difference is close to 0%. The following are to be included in this category of functionalities (Figure 11):

- the modularity of structure, which enables to connect and disconnect simulation components (e.g. extending a simulation with new areas to develop next competences or the simplification to take account only of key aspects);
- the parametrizaiton of a simulation play that affects the way of its conduct (e.g. a difficulty level or the complexity of reality mapping);
- eventualization, where decisions may influence the way of further performance of the simulation (e.g. the conduct of processes); and
- analytical tools that return comprehensive analogous data to real business situations, thus supporting the process of taking decisions.

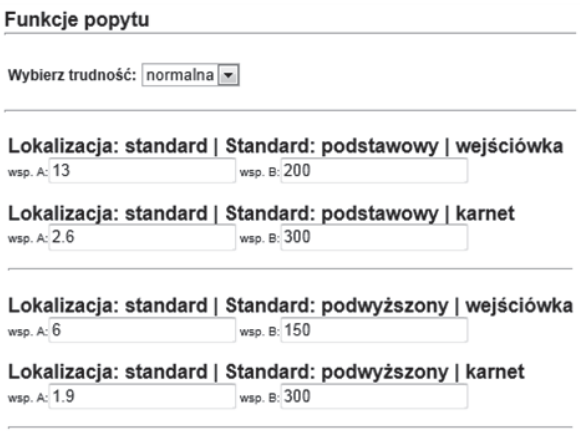
Moreover, the results show that simulation participants indicate **no major impact** on the efficiency of the simulation performance for a number of components (Figure 11). Such elements include, as can be easily predicted, information on simulation algorithms, but also some elements that may be surprising in terms of practical experience, such as obtaining access to reports that justify the achieved results. Such assessments can be interpreted as the willingness of trainees to achieve solutions alone through the analysis of generated results, without getting any 'clues'.

The results of the questionnaire show explicitly **what components should be included in simulation applications** to provide the most effective performance of the educational process. The following selected elements were available in the Case Simulator system:

- the option to parametrize a game in terms of demand function indexes depending on a type of offer (Figure 12A);
- statistics that facilitate taking a decision in the form of the impact of advertisements on sales or the load of machines;
- statistics of generated results compared to other teams (Figure 12B);
- teamwork of simulations (partial, owing to the option of using the same account simultaneously by a number of users).

The results of the questionnaire, indicating a very important role or irrelevance of individual elements to be included in educational simulations, **confirm the proposed research hypothesis** that the method of performing the innovative teaching tool architecture designing process has a major impact on the efficiency of business simulations.

A)



B)

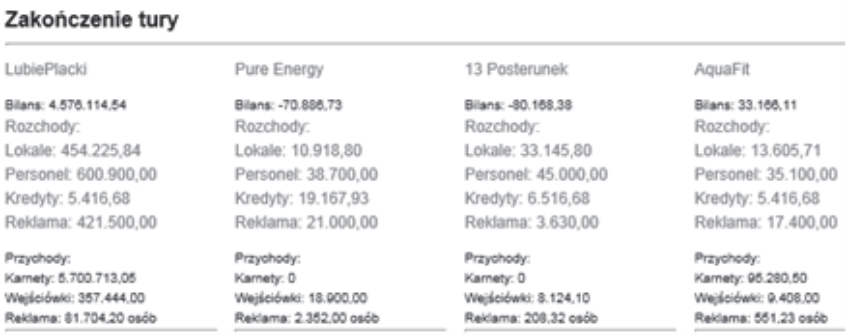


Figure 12. Selected elements of the Case Simulator system architecture that influence the efficiency of study

Source: Own study based on http://casesimulator.pl/simulator.

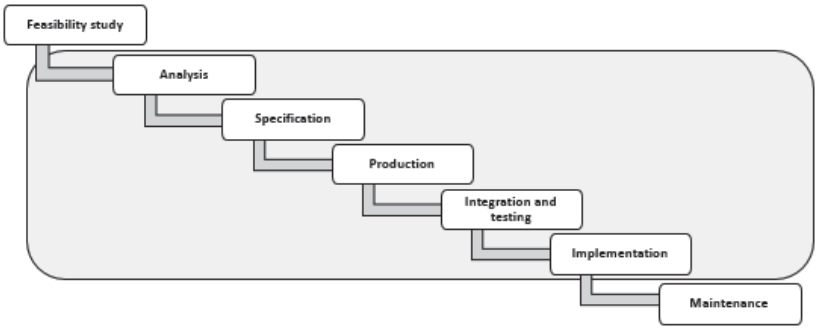
The results of the questionnaire are the basis for developing **a unique model** of simulation architecture design processes and the subsequent production of architecture. The relevant approaches are presented in the following points of this chapter.

Innovative teaching tool architecture designing model

The developed model takes account of the necessity to prepare a simulation system **business model and an architecture design** of high quality. The weight of individual components obtained in the research indicates which elements

should be considered first. Including all of them may require excessively high financial outlays and long time; therefore, it is necessary to make a reasonable choice. The performance of the simulation preparation projects is generally based on IT system design management models, both traditional, based on the linear cycle of project life, where processes are carried out sequentially, and adaptational ones, where stages are implemented in iterations and the system is prepared incrementally (Figure 13).

A)



B)

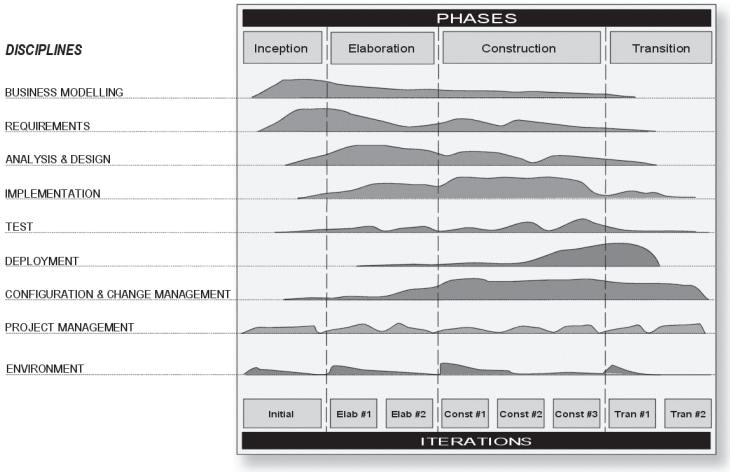


Figure 13. Linear (a) and iterational-incremental project life cycle (b)[23]

Source: S. Moore, *Strategic Project Portfolio Management*, Wiley, Hoboken 2010, p. 124 and P. Kroll, P. Kruchten, *The Rational Unified Process Made Easy*, Pearson, Boston 2003, p. 10.

[23] Figure 13 refers to the RUP methodology that is related to an objective rather than adaptational approach.

Project management models are not fully adapted to the unique characteristics of educational simulation preparation. Moreover, they do not contain aspects related to designing the architecture of innovative teaching tools for the effective performance of business simulations. Literature presents a number of aspects that refer to the development of educational simulations. However, only few of them focus on the presentation of project management models, in particular within the **simulation architecture design process** in the context of teaching objectives and instructions. In this regard, the model developed by J.R. Kirkley, S. Kirkley, and J. Heneghan is worth mentioning (Figure 14). It has the characteristics both of the traditional approach with regard to the general sequential performance of processes, and the adaptational one, where a prototype is created in iterations.

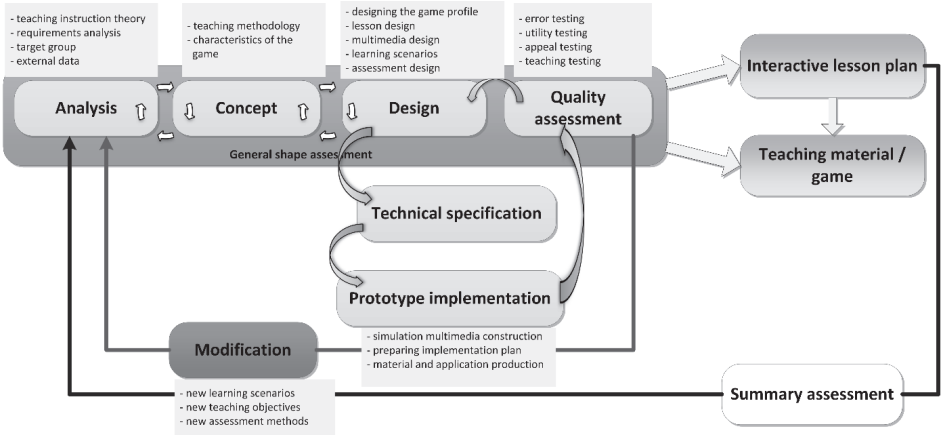


Figure 14. Simulation game instructional design model

Source: J.R. Kirkley, S. Kirkley, J. Heneghan, *Building bridges between serious game design and instructional design*, B. Shelton, D. Wiley (eds.), The design and use of simulation computer games in education, Volume 2, Sense Publishers, Rotterdam 2007, p. 74.

The approach of J.R. Kirkley, S. Kirkley, and J. Heneghan does not take account of a number of elements that have been highlighted in the research results. Therefore, an original solution has been prepared that can be applied not just in designing but in preparing business simulations as well (Figure 15).

The developed **model integrates** the present knowledge of IT project management, which definitely includes the preparation and implementation of simulations, a model developed by J.R. Kirkley, S. Kirkley, and J. Heneghan as well as the outcome of the research. The author's model **modifies and extends** significantly the concept proposed by J.R. Kirkley, S. Kirkley, and J. Heneghan. First and foremost, it introduces in the analysis and designing stages the aspects that result from questionnaires and the presentation of interaction among them. Moreover, it broadens the approach of J.R. Kirkley, S. Kirkley, and J. Heneghan

with the highlighted implementation process[24] that contains the integration with simulation of asynchronic and synchronic communication tools as external applications.

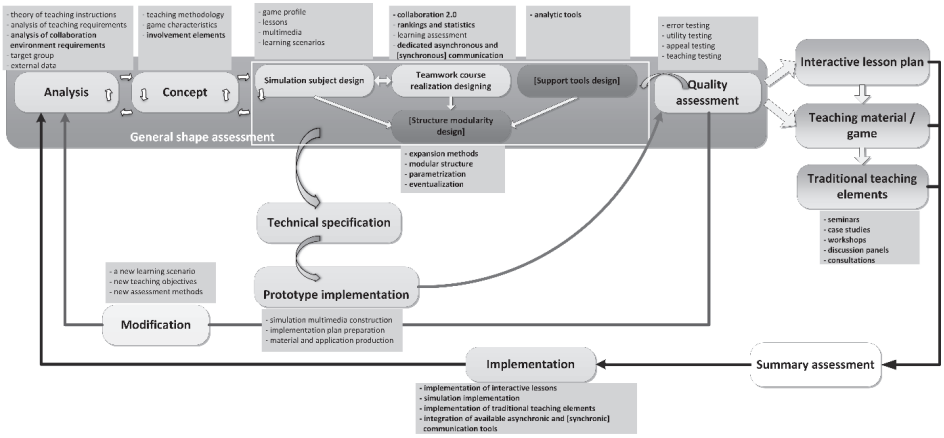


Figure 15. Model of innovative teaching tool architecture design and preparation process for the effective performance of business simulations

Source: Own study.

Moreover, the model includes the **simulation implementation in the mixed mode**, which was indicated in the questionnaires as crucial, where also traditional meetings take place. This solution enables to develop both communication and teamwork skills, reducing the sense of alienation among simulation participants and providing a high level of cooperation interaction. According to research results, optional processes and activities have been also distinguished in the model, marked with square brackets and darker background.

Conclusion

This chapter presents the original model of innovative teaching tool architecture designing and preparation processes for the effective performance of business simulations. Its aim is to support the implementation of didactic simulation development projects, to provide teaching tools that deliver effective education.

The original concept has been developed based on the analysis of literature presented in the introduction, in particular the model of teaching environment design factor model highlighted by E. Kirkley and J.R. Kirkley, which indicates

[24] The implementation process takes place in most approaches to IT project management.

also the requirement to carry out further explorations for extending such factors. For this purpose, a relevant questionnaire was developed about the importance of 19 factors in the teaching simulation architecture. The results of questionnaires presented in the next item of the chapter have indicated which factors are most important: teamwork in simulation performance supported with suitable communication tools and competition based on rankings. Moreover, the research has indicated elements of simulation architecture that are less important or irrelevant.

The last part of the chapter analyses the available approaches to implementing projects of teaching simulation preparation, both general ones related to software engineering and few dedicated ones. The analysis outcome shows the shortcomings of the above-mentioned approaches; therefore, an original solution was proposed in the form of a model that extends the available methods, in particular in the area of design and implementation processes.

Chapter 6

European Skills Achievement Test as an innovative tool for measuring the effectiveness of higher level education

Introduction

The main goal of this article is to discuss methods of achieving high effectiveness of universities mostly in the area of graduate employability and to analyze an innovative instrument measuring university employability which is the European Skills Achievement Test. The article will present the instrument and will draw conclusions on its possible future use.

The effectiveness of higher education institutions can be measured in numerous ways. A typical approach is to form the goals for the given grade of education e.g. educational standards, and measure the progress of students in acquiring knowledge and skills in the course of the studies. Besides, an employment success rate of higher education graduates is usually stressed as an important factor. It seems that involving higher education stakeholders, e.g. employers, can increase significantly the effectiveness of higher education institutions. Employability seems to be the most important factor that determines the effectiveness of higher education. The discussion on recent research findings in this area is presented below, including different types of higher education institutions and countries.

Some very interesting observations on the topic were made in Scotland. Within the framework of the University of Glasgow research on the employers' perceptions of employability skills of new graduates, the authors conducted the literature review on the development of employability skills built in British higher education institutions in recent years[1]. They observed that: 1) 'the development of employability skills and attributes in higher education should be in-

[1] K. Lowden, S. Hall, D. Elliot, J. Lewin, *Employers' perceptions on the employability skills of new graduates*, University of Glasgow SCRE Centre and Edge Foundation 2011.

tegrated within the curriculum, 2) students should be entitled to experiences in higher education that develop understandings, skills, self-theories and reflection and that this good learning and education improves employability, 3) some universities are changing the way courses are taught to build employability skills into the curriculum, including providing work based experience, 4) Structured work experience has clear positive effects on the ability of graduates, firstly, to find employment within six months of graduation and, secondly, to secure employment in graduate level jobs'[2].

Also some Indian experiences confirm the above observations. R. Khosla from the Indus Business Academy indicates that involving employers as stakeholders in designing MBA curricula increases significantly the employability of MBE graduates[3].

The study conducted by the Victoria University demonstrates that a special 'expectation – performance gap exists despite efforts to articulate the attributes required of accounting graduates. The study contributes to the ongoing debate about the role of accounting education in developing employment skills that meet the needs of employers. Additionally, the findings suggest that enhanced authentic assessment tasks including greater use of group work to enhance team skills have potential to improve graduate employability outcomes'[4].

High employability of university graduates is a key factor determining the effectiveness of higher education institutions regardless of their type. The high level of such effectiveness can be also met in distant learning. The group of authors from the Open Malaysia University indicate that employability criteria can be met even in open distant learning[5].

Stakeholders and society are the key evaluators of the employability effectiveness of universities. Thai researchers working on the development of components and indicators of organizational effectiveness for higher education institutions came to the conclusion that satisfying the society is a key factor for organizational effectiveness of higher education institutions[6].

It must be stressed that the higher education effectiveness is not easily measurable. American authors J. Cunha and T. Miller in analyzing the value added created by the higher education institutions emphasized the role of different methods of measuring students achievements with certain stress placed on ex-

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[2] As above p. 11.

[3] R. Khosa, *Exploring employers expectations with changing market trends: A Study in reference to New Emerging Potential & Promising B-Schools' in NCR*, "International Journal of Management and Strategy" 2011, No. II, Issue II, January–June 2011.

[4] J. Naidoo, B. Jackling, B.Oliver, M. Prokofieva *Identifying employment expectation-performance gaps of accounting graduates using Graduate Employability Indicators,* Victoria University, 2012.

[5] T. Lim, M. Fadzil, L. Latif, N. Goolamally, N. Mansor, *Producing Graduates Who Meet Employer Expectations: Open and Distance Learning IS a Viable Option,* Open Malaysia University, 2011.

[6] C. Kraipetch., S. Kanjanawasee, A. Prachyapruit, *Organizational effectiveness evaluation institutions, effectiveness for higher education institutions, ministry of tourism and sports*, Chulalongkorn University, Thailand, "Research in Higher Education Journal" 2012.

perimental methods[7]. Those methods seem to be the most evident but they are difficult to conduct.

Moreover, experiences gained in assessing lower levels of education can be sometimes useful in measuring higher education institutions performance. Tennessee Council on Vocational-Technical Education in its report of employers' expectations[8] stressed that 'Employers who responded to the conducted survey indicated that they are experiencing a major problem with productivity because of excessive employee absences and tardiness. High school counsellors and technology centre student services coordinators also indicated that students often fail to show up for class. This truancy dilemma can be attributed to several things: rebellion against controls of time and space, lack of motivation, disinterest, disability, tight labour market, or any number of personal problems'. The research emphasized that the gap between employers' expectations and students' perceptions of such expectations was greatest among vocational-technical high school students. It was closely related to business ethics and values, and students will need more interaction with employers during their high school years. Also other research concerning higher education revealed problems with proper attitudes to work.

It seems that the problem of matching employers' expectations with the skills and knowledge learnt by graduates is still significant. The research conducted in Sri Lanka[9] revealed that 'possessions of university graduates of key skills sought by employers are lacking. Universities do not generate the required labour skills for the society and undergraduates lack of knowledge about reality of the labour market situation. This skill mismatch leads to a higher number of unemployable graduates in the economy.'

Romanian researchers[10] show that the research comparing graduates and employers expectations done in Romania in 2006 revealed that graduates put on the first places practical knowledge, communication skills, adaptability, self-esteem and ability to solve problems, while employers put on the first places aspects such as moral qualities of individuals, the capacity to assimilate new knowledge, the capacity to work in teams, written and oral communication.

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[7] J. Cunha, T. Miller, *Measuring Value-Added in Higher Education*, Context for Success, September 2012.

[8] *Tennessee Council on Vocational-Technical Education. Employer Expectations*, Bureau of Business and Economic Research/Center for Manpower Studies at The University of Memphis, Memphis, Tennessee, August 2000.

[9] S.Weligamage, S. Siengthai, *Employer Needs and Graduate Skills: The Gap between Employer Expectations and Job Expectations of Sri Lankan University Graduates*, 9th International conference on Sri Lanka Studies, 28th–30th November 2003, Matara, Sri Lanka.

[10] L. Nicolescu, C. Păun, *Relating higher education with the labour market – graduates' expectations' and employers' requirements*, paper presented to the 29th annual EAIR forum 26 to 29 August 2007, Innsbruck, Austria.

In the research conducted for the European Commission[11] on the effectiveness of public spending on the tertiary education, it occurred that it becomes clear that better performing countries are not necessarily those where more resources are spent on higher education. It is efficient spending that matters. It follows that increased spending will be much more successful in output terms if it is efficiency enhancing. It again stresses that the size of spending is not crucial for the highly effective higher education.

The overview of the recent research done in numerous countries all over the world reveals that there is not a single approach to measuring the effects of educational efforts of higher education institutions. There is still a lot to be done to adjust the services of universities to the needs of employers. The European Commission study based on numerical indicators such as the 'number of students per instructor' or 'expenditures for one student training' does not answer a typical question what will be the earnings of the graduate for those expenditures. The weakness of the up-to-date research efforts is evident.

Concept of the General Skills Assessment Tests

The measurement of the educational progress can be made on the basis of the quasi experimental approach called reflexive comparison. Reflexive comparison may include the measurement of the knowledge and skill level at the beginning of the studies and at their completion. Such an approach seems to be logical when we accept that there are no external factors influencing the skill and knowledge levels of students in the meanwhile.

Typically, it is nearly impossible to separate the learning effects acquainted during the learning process at university and similar effects gained by students who practice working during their studies. In such a situation it is nearly impossible to separate the learning outcomes that arise thanks to university efforts and other effects which result thanks to other activities of students. It is especially important when a student is active in e.g. the non-governmental sector, music life and also in pursuing different hobbies. The organizational, practical experience students gain during work in such units is an important experience which increases significantly the employability of graduates.

The above-mentioned difficulties suggested to look for other solutions, which would measure employability skills of university graduates more directly. Coming back to the numerous research studies on the employers' expectations on the employability skills of graduates it must be admitted that approach: 'Employer Expectations – University Fulfilment' creates the most

[11] M. Aubyn, Á. Pina, F. Garcia, J. Pais, *Study on the efficiency and effectiveness of public spending on tertiary education*, MISEG – Technical University of Lisbon, December 2008, Economic and Financial Affairs Directorate, "Economic Papers" 390, November 2009.

logical dimension of the university effectiveness measurement in relation to graduate employability.

Based on this approach, a project Skills for the Future (SKIFF) was launched by the Institute for Private Enterprise and Democracy with 3 European partners (from Portugal, Italy, and Turkey) within the framework of the Erasmus Lifelong Learning Program. The examination of the employers' expectations was one of the key activities and the gained knowledge could be used to propose the content of specific examination measuring how university graduates fulfil the expectations of employers towards knowledge, skills, and attitudes expected from higher education graduates. The project was started in 2009 and finished in 2011. The main project activities took place in 2010.

The achieved research results on the differences between employers' expectations and university fulfilment in work attitudes indicated that[12]:

1. The highest differences between the needs of enterprises and the delivery of higher education institutions observed in Poland were: loyalty to the company, honesty – personal ethics, time-elasticity, and responsibility.
2. The highest differences in Italy concerned loyalty to the company, honesty – personal ethics, and respect to others.
3. In Portugal the largest differences concerned: taking the responsibility, honesty – personal ethics, loyalty to the company, and respect to others.
4. In Turkey the largest differences between needs and provision concerned such attitudes as: respect to others, honesty – personal ethics, loyalty to the company, and willingness to take tasks.

It was observed that in all surveyed countries personal values had the highest calibre in expectations and low provision with some variations concerning direct work attitudes, including time flexibility, responsibility and tasks taking. This result shows that enterprises in all participating countries expect from higher education institutions mostly building high personal values and unfortunately the provision of such values by higher education institutions is relatively low.

According to the results in the comparisons between expectations and fulfilment in the area of skills, a concluding remark from international comparison seemed to be very surprising. In no surveyed country the technological skills provision was evaluated as a problematic issue. Universities can provide technology application skills on the level that can be developed by enterprises with no big problems. However, problems do exist in different spheres. The problematic issues are different in the respective countries[13].

1. In Poland, communication, team work skills, problem solving and enterprise skills were provided in 50–70% of the required values, constituting the very broad spectrum of problems. 2 key spheres with largest gaps

[12] P. Kulawczuk, M. Bąk, A. Szcześniak, P. Bednarz, *Skills for the future. How higher education institutions fulfill expectations of entrepreneurs in Europe Insight into situations of Poland, Italy, Portugal and Turkey,* IPED, Warsaw 2011.

[13] P. Kulawczuk, M. Bąk, A. Szcześniak, P. Bednarz, *Skills for the future…*

were: interpersonal skills and enterprise and initiative skills. Learning skills and technology skills were provided better. It shows that in general Polish universities cannot offer practical skills that can be highly valuable for companies and the provision is on the level from moderate to low. The spectrum of problems is very broad.

2. In Italy, problems exist in different spheres. It seems that the problem of Italian universities is a low provision of personal behaviour skills. When we take into consideration that the highest gaps were observed in: the capability to accepts and support leadership, adaptation to new situations, the capability to transfer effectively between individual and team work, and, on the same level: negotiation skills, the capability to work across different ages, genders, and cultural diversities – we may state that students do not receive answers concerning personal behaviour rules. The higher education schools in Italy, accordingly to opinions of surveyed entrepreneurs, do not teach skills concerning living with other people. It also must be emphasized that in Italy there was a serious gap between the needs and provision concerning intermediate computer skills.
3. As we can see, the situation in Portugal is more complex, as there are nearly no problems with technical skills and learning skills. However, there are significantly more problems in enterprise and initiative skills, and in personal planning and organizing. Turkey presents a more optimistic picture; nevertheless, the problem is the lowest average level of expectations of enterprises from higher education institutions.

In all surveyed countries there was one important sphere where provision was significantly lower than needs: it was interpersonal skills connected with human behaviour. Most enterprises observed that new employees cannot function easily after graduating, have important adaptation problems, and have difficulties in cooperating with other employees. This definitely can be improved by universities. Another very important sphere where provision is highly unsatisfactory is the sphere of enterprise and initiative skills. As the issue of interpersonal skills can be explained to some extent, there is no easy answer why enterprise and initiative skills are not provided in the needed amount. Learning skills creates significantly less problems. Graduates are ready to learn and universities provide this group of skills relatively efficiently. Surprisingly, the workplace technical skills create the lowest problem. It can be explained that higher education institutions strongly orientate their efforts towards technologies and enterprises can see this effort. The effects of those efforts are rather positively evaluated by enterprises.

Based on such observations concerning the differences between employers' expectations and educational institutions provision, the key problem spheres were indicated as a field for significant improvement. They included the following skills and work attitudes:

1. Loyalty to the company,
2. Personal honesty,

3. Taking responsibility,
4. Teamwork,
5. Practical approach,
6. Supporting leadership,
7. Generating solutions, and
8. Building climate of confidence.

Moreover, about 10 less important differences were observed. On the basis of the key problematic issues, the questions checking the approach to the problems were formulated. The questions had a decision making character and typically started with the phrase *What would you do if…* followed by answers representing the possible reactions.

We did not check knowledge but work attitudes and skills allowing to perform managerial or independent tasks by university graduates in an enterprise or an institution. The discussion on the contents of the questions measuring the employability of university graduates is presented hereunder.

Test For The Best. European Skills Achievement Test design

The test was organized in the form of a contest in four countries: Poland, Portugal, Italy, and Turkey. The Contest Goals[14] provided that the 'competitiveness of European Enterprises is strongly dependent on the quality of the human capital. Human capital is critical for the development of European economy. Only when students and graduates of higher education institutions gain attitudes and skills really valuable for enterprises, the business sector can develop dynamically.' The first contest goal was to reduce differences in enterprises' expectations and educational services provision by showing higher education institutions what is really needed by the business sector. The contest questions and exercises were reflecting real needs of enterprises and the level of those needs fulfilment was to be checked during the contest. The second key goal was aimed at highly motivated young people, who wanted not only to pass all formal exams to receive graduation, but who actually wanted to contribute to the business sector development in Europe. By attending the contest, they could receive prestigious certificates being the evidence to the employers their real preparation to work in enterprises. It was foreseen that the European Certificate on Skills Achievement can be a valuable instrument facilitating the employment of young people and turning their interests on those areas which are really needed by the enterprise sector.

The Contest was organized within the framework of Erasmus funded project SKIFF[15]. Skills for the Future. Lifelong Learning Programme, DG Education

[14] *Test For The Best. European Skills Achievement Contest, Contest Goals*, Skills for the Future.
[15] *Test For The Best. European Skills Achievement Contest, Contest Rules*, Skills for the Future.

and Culture. The Contest was organized by: the Institute for Private Enterprise and Democracy – IPED (Poland), ERIFO (Italy), 3) Gestao Total (Portugal), and 4) Ahi Evran University (Turkey). The Contest was directed to three educational spheres: management and economics, engineering, and business services (finance, advertising, bookkeeping, legal services etc.). The main aim of the Contest was to promote achieving skills and attitudes that are needed in enterprises to facilitate better adaptation of higher education graduates to the needs of enterprise sector. The Contest checked the level in which the last year (or term) students of bachelor or masters levels, together with the higher education graduates non later than 2 years after graduation, achieved the skills and attitudes needed by enterprise sector. The level of achievement was measured in percentage, where 100% was the maximum rating and 0% was the minimum rating. All students studying in the EU and EU-associated or candidate countries might participate. The test examination was conducted in the national languages of Poland, Italy, Portugal and Turkey. Contest participants attending the contest procedure received certificates indicating the percentage of skills achievement test in the range between 0 and 100%.

The recruitment of students for the Contest was open, available for all students and based on the first come – first go rule. Within the scope of SKIFF project duration, the Contest was free for students and costs were covered by the organizers from EU funds and own resources. The national organizers were responsible for announcing the Contest on the Internet, for informing at least 60% of higher education institutions in the project spheres in the respective countries and asking them to promote the Contest on their websites. The participants of the exam registered on the websites of national organizers. The examination was done in the form of a written test. The contents of the test were delivered by IPED in English and the original text was translated into national languages by national contest organizers. Each national organizer was responsible for keeping the secrecy of the questions and was obliged to assure that the content of the test would be revealed only at the examination meeting.

IPED was responsible for preparing a sample test for orientation of contest participants. A sample test was prepared in English by IPED and all national contest organizers were to translate the sample into their national languages and locate them on their websites openly. The examination took place on the same day and time in 4 respective countries and lasted 120 minutes. The examination took place on Wednesday, June 16, 2010, at 12:00 (midday). The national organizers had 2 weeks to evaluate the written tests and announce the results to the public.

Test contents. How to measure the educational progress in response to employers' needs?

The skill test questions were based on presenting problems to graduates and making decisions by the graduates. The team of authors, which consisted of Przemysław Kualwczuk, Mieczysław Bąk, Anna Szcześniak and Paulina Bednarz, reacted to 8 key problems diagnosed in the survey of employers' expectations with propositions of work situations in which each test participant should take a decision what to do. In certain questions, the examined were asked to propose their solutions. When the team of authors agreed on problem situations, the individual authors proposed scores to different types of decisions. Typically there is one good choice in most choice tests and e.g. 3 wrong ones. The team observed that in real life there are solutions that are best, of moderate quality or very wrong. This allowed the authors to graduate scores and give scores such as 0 – for a completely wrong decision and e.g. 0.5 for moderately positive decision and 1.0 for the best decision. The scores reflected employers' expectations. Such an approach allowed for accepting the assumption that responses and agreed scores reflected real life and real work conditions. However, it must be accepted that most situations had a hypothetical (simulation) character, because the examined did not participate in real decision situations. Below, 15 examples out of 40 decision situations are presented. They are matched with employability area checked.

Table 7. European Skills Achievement Test. Example Questions, Checked Areas and Accepted Scoring

Selected decision making problems	Area checked	Scoring
1. You came to work and got informed that the retired ex-boss who has run the company for many years passed away. He was the one who employed you and supported your professional development. He quit the company 15 years ago. Your company has exposed a picture of the deceased and lighted a candle next to the entrance door. The funeral is planned in two days in a town 200 km away. You can take a day off and go to this funeral but your department is going through some production problems. In one week you are finishing a fixed contract for a client from abroad and you may be needed at this time in the company. However if you ask for a day off, your boss will give it to you. What do you do? a) You will not go to the funeral. You must be at work; b) You will take a day off. You will explain that you are entitled to have it in these circumstances. Your boss will be unhappy; c) You will go to your boss and tell him that you have to be at this funeral. You ask for a day off. You can work more after if it is necessary; d) For this day you will arrange a business trip to a client and after that you will go to the funeral.	Loyalty	a) 0.0 b) 0.7 c) 1.0 d) 0.3
2. Your company is producing clothes and employing 500 workers. This year sales decreased due to the crisis on the eastern market. The boss informed that the company is heading for a bankruptcy and one and only solution to survive these hard times is reducing the wages by 30% or dismissing about 20% of workers. These solutions will let the company survive this difficult period. You are a supervisor of the trade union in this company. What do you do? a) You will threaten your boss with a strike if he tries to dismiss workers or reduce wages; b) You will talk to the team if a temporary reduction of wages would be acceptable; c) If your trade union members are not dismissed, you will accept the possibility to dismiss 20% of workers; d) You will organise a referendum.	Loyalty	a) 0.0 b) 1.0 c) 0.0 d) 0.3

Selected decision making problems	Area checked	Scoring
3. You got employed in a production company. You have applied for 3 posts and it was the production company who answered the first and offered you a salary equal 80% of average national wage. You have accepted these conditions and now you are employed for 3-month trial period. After 2 months of working in this company, a second employer contacted you and offered you a salary equal 100% of average national wage. What do you do? a) You will turn down the offer of the second employer. You already have a job. b) You will accept the offer of the second employer. You are during the trial period and you can quit. c) You will wait till the end of the trial period and inform that you have another 100% offer and you ask for a rise. d) You will start negotiations with the second employer and if you agree with other work conditions you will quit the first employer next day.	Loyalty	a) 1.0 b) 0.0 c) 0.3 d) 0.0
4. You work in a construction company, which gains 80% of its revenues from works realized within public purchase orders. You get to know about the tender for the school building implementation. Your company wants to take part in this tender. You visit future construction site and discover that there is already work in progress carried by company X. What do you do? a) You take no action b) You inform your boss that one of the companies have already started working, before the tender is settled. c) You notify police about economic offence. d) You try to talk with the representative of company X about future cooperation in tender order realization.	Personal honesty	a) 0.0 b) 0.5 c) 1.0 d) 0.0
5. You have to sell a 9-year-old car after two bumps which is worth 6000 euros. Similar cars having no earlier bumps are worth 8000 euros. The car is well renovated and the repairs are not visible. The car is being sold at a square where every contractor can negotiate the price and ask for the technical condition. When the price is so low the clients are checking cars in detail very rarely. Which method will you use to successfully sell the car? a) You will write that the car is after 2 bumps and you want 6000 euros for it; b) You will write that the price is 8000 euros. If he client discovers that it is after two bumps, you will lower the price to 6000 euros. c) You will write that the price is 8800 euros and you will lower the price by 400 euros every 15 minutes till you stop at 6000 euros. d) You will write that the car is just after renovation and you want 7000 euros for it.	Personal honesty	a) 0.3 b) 0.0 c) 1.0 d) 0.7

Selected decision making problems	Area checked	Scoring
6. You work in the purchasing department of a construction company. Based on specifications received from different departments of your company you decide from whom and for how much to buy a variety of building materials. As a head of the purchasing department you got a task to reduce the cost of materials purchases by 15%. Which method will you choose? a) You organize a tender for the general supplier, which ensures the lowest prices for key materials; you have 'free hand' to buy the rest of the materials. b) You will organize individual tenders for each material, despite the fact that it would be a huge workload. c) You group the materials to form main groups and organize tender for each main group; you have "free hand" to buy the rest of the materials (which were not included in main groups) d) You collect offers from all suppliers and choose the cheapest one	Responsibility taking	a) 0.0 b) 1.0 c) 0.0 d) 0.5
7. You are a manager of a publishing department in a service company. You are responsible for publishing of your company annual reports, advertising materials, visiting cards etc. It is your duty to make sure that all materials are printed correctly and on time. The company has just received a delivery of brochures promoting the services of the company with an edition of 2000 copies worth 50% of your monthly salary. You have noticed that there are mistakes in contact data of the company which you didn't check during the last control of these data, neither your assistant noticed them. What do you do in such a situation? a) You will tell your boss that it is a fault of your assistant who was responsible to make sure that everything is correct; b) You will tell your boss that it is a fault of the printing office because they knew what the correct contact data of the company are, for example from your e-mail signature; c) You will tell your boss nothing. If he does not get to know, nobody will take the responsibility. d) You will tell your boss that it is your fault and you are ready to cover the expenses for the new edition with a possibility to pay in a few instalments.	Responsibility taking	a) 0.0 b) 0.0 c) 0.0 d) 1.0

Selected decision making problems	Area checked	Scoring
8. You have got a task to organize a catering service for a meeting of sales representatives of your company from 3 regions. Two days before the meeting it turns out that you have a serious health problem. At the same time you realize that you did not arrange all the details with the catering company. What do you decide? a) You call your boss and inform him about your health problem, a necessity to go to a doctor and about your absence from work during the next few days. b) You call your colleague from the same room and inform her that you have to go to a doctor. You tell her that you did not arrange all the details regarding the catering. You go to the doctor, receive a medical certificate and send it by fax to the company. c) You call your boss and inform him about all the details in a phone conversation. You contact the person who will take your responsibilities during your absence and you inform what has to be arranged. You go to the doctor. You will be absent from work during the meeting. d) You inform your employer with a text about the problem and about your absence during the next few days; you go to the doctor and to the sick leave.	Building confidence climate	a) 0 b) 0 c) 1 d) 0
9. You would like to work in the hours different from the standard working hours in your company. Suggest 4 possible ways to plan your work time, which would be acceptable by your employer: 1) 2) 3) 4)	Generating alternative solutions	0.25pt. per each logical solution
10. You supervisor is running a meeting about future activities and work programme of your company for the next few months. One of the tasks is to increase sales level in the region X. To present the problem, your principal is using wrong data from a different region. Only you know about that. What is your reaction? a) You take the floor and present the right data. b) You say that in your opinion region X is not having such big problems. c) You find other arguments supporting your supervisor's opinion. d) Only after the meeting you inform your boss about the mistake he made, assuming that sales growth will be anyway beneficial for the company.	Supporting leadership	a) 0.1 b) 0.0 c) 0.0 d) 1.0

Selected decision making problems	Area checked	Scoring
11. You have been a junior manager for about 7 years now. To be promoted to a senior manager you may choose one of 4 options. Which one will you choose? a) highlight your achievements and others' mistakes as often as its possible, b) complete additional courses and trainings at home and abroad, c) make friends with your principal and win his favour, d) change your place of work from time to time,	Strategic approach	a) 0.0 b) 1.0 c) 0.3 d) 0.3
A lecturer is reading loudly the marked text and the participants answer the questions. 12. (http://news.bbc.co.uk/2/hi/entertainment_and_arts/10154682.stm) U2 have pulled out of the Glastonbury Festival and postponed their US tour after Bono had emergency surgery to save him from possible paralysis. The singer, 50, had a back operation on Friday after suffering an injury while training in preparation for the tour. Neurosurgeon Joerg Tonn said: 'The surgery was the only course of treatment for full recovery and to avoid further paralysis.' Bono, who must recuperate for the next two months, said he was 'heartbroken'. Test True / False: a) The leader of U2 is threatened with a paralysis. T/F b) U2 has cancelled their concerts in USA. T/F c) On Tuesday Bono had a back operation. T/F d) U2 will perform at the Glastonbury Festival. T/F	Ability to hear and understand	0.25 pt. per each right answer
13. You are a well-known specialist in interior design of private houses and public buildings, including churches. At one time you got 4 commissions but you can choose only one. Which one will you choose? a) interior of the summer house of the President of big company, 20000 EUR for the project, you have already done 30 similar projects, 100 working hours b) interior of the headquarters of a political party, 12000 EUR for the project, you have never done anything like this, 140 working hours c) interior of 24 houses for the catalogue of finished houses, 18000 EUR plus 120 EUR for each bought project in the future, you know how to do that, 160 working hours d) interior of a nightclub, 24000 EUR, 80 working hours, you have never done anything like that	Strategic approach	a) 0.6 b) 0.3 c) 1.0 d) 0.0
14. Describe in four sentences your professional goals.	Clear explanations	0.25 pt. per each right answer

Selected decision making problems	Area checked	Scoring
15. You go for 2-week vacations to a country which is about 3000 km distant from your country. Airline baggage weight has just been reduced to 8 kg. You can take only 8 kg. Specify what you will take. Here are the weights of things that you can take: a minimum set of cosmetics 0.8 kg, a complete set of cosmetics 1.5 kg, trousers 1.0 kg, a dress 0.6 kg, a skirt 0.5 kg, a T-shirt 0.4 kg, a guidebook 0.6 kg, shoes 0.8 kg, an underwear set 0.3 kg, a hair dryer 0.6 kg, slippers 0.6 kg, your medicine 0.3 kg, your favourite candies 0.4 kg, a bottle of favourite drink 1.0 kg, a weight of suitcase on wheels 3 kg, bags' weight 1.0 kg. You can choose only the things listed above. You may choose the gender of the traveller.	Practical approach	Max 2pts. in this 0.5 pt per 1) no of items. 2) minimizing washing. 3) maximizing comfort and 4) minimizing unnecessary items

Source: European Skills Achievement Test, authors: Przemyslaw Kulawczuk, Mieczysław Bąk, Anna Szcześniak, Paulina Bednarz.

As it was presented in the table, most questions were of practical character and university graduates quite possibly could meet such situations in real work. It must be admitted that scoring a number of questions raised doubts about the right direction of decision making. The authors in all cases were favouring business ethical approaches, practicality, and personal values expected by employers.

Test results

The test in Poland took place in June 2010 in Sopot at the University of Gdansk, Faculty of Economy. It was coordinated by the Faculty representative, dr Andrzej Poszewiecki, who also assisted in checking the examination questionnaires. In total, the Contest in Poland gathered 61 participants who answered 40 questions within the period of 120 minutes. 90% of participants were students of the University of Gdansk and the remaining were the students from public and private higher education schools. The test organizers set up the limit of 60 points out of 100 to pass the test. 58 persons passed the test and only 3 failed it.

Average results by genders

The average score for the participants was 69.1 points in the scale 0–100. Women (34) received the average score equal to 69.0, while for men (27) the result was 69.3, i.e. nearly the same. It shows that higher education institutions prepare students of both genders in a similar way from the point of employability.

Average results by education grade

The average score for Contest participants for a bachelor level was 68.0 while masters degree gave the result of 72.1. This difference, which is only 6%, reflects additional 2 years of studies. It seems that from the point of employability the graduates of the 1st grade differ slightly from the 2nd level. It also shows that students of the second level need to have more decision-oriented exercises and workshops.

Average results by the field of study

The test was attended by the students (graduates) of ten fields of study (education – 3, economics – 36, finance and accounting – 9, international business – 6, history – 1, IT studies – 1, mathematics – 2, political studies – 1, management – 1, European studies – 1. It is logical to count averages to such fields of study which were represented by at least by 3 attendees. The highest average grade was achieved by finance and accounting students – 72.0, economics – 69.9, international business – 69.3 and education – 57.9. Students of education were less prepared to the test than the rest of participants.

Dispersion of the results

The results were dispersed to the right direction of the scale of points. It probably reflects the fact that master's degree students received relatively higher numbers of points. This dispersion was not normal.

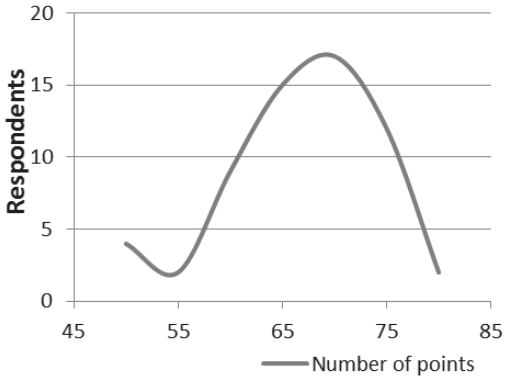

Figure 16. Dispersion of the results

Source: Own computations.

Conclusions and further research activities

The design and application of the instrument measuring the employability of the higher education graduates allow for formulating the following conclusions:

1. Preparation of a tool measuring the employability of university graduates seems to be relatively time consuming. It is a tool that reflects changing employers' expectations and the right design of the test would require regular examinations of employers' expectations.
2. This can be automated when electronic surveys on the preferences could be done. This will reflect the needs with little time delay.
3. The formulation of questions and detailed scoring requires teamwork and discussion.
4. Tests should be repeated from time to time in order to measure the progress in delivering services by an educational unit.
5. The system could be used as the entry and exit exam showing the difference of educational provision in decision making skills and in work attitudes.
6. The further research should explore much more business life situations that require decisions and suggest new managerial decision outlines that may lead to new skill tests.
7. To provide better comparisons of the service quality of educational units, it would be good to conduct managerial skill tests in a larger group of universities.
8. This approach allows for also the international cooperation of universities and the international collaboration in this area is highly valuable.

Chapter 7

Developing entrepreneurial attitudes with innovative knowledge transfer tools – example of *Case Simulator* project

Background

The unemployment rate among youth entering the labour market in the EU countries has risen significantly in recent years[1]. In addition to causes resulting from the economic situation (the crisis that began in 2008), there is a group of factors related to the dissonance between the market demand for employees holding special qualifications and the supply of labour. This difference is proven by the Beveridge curve that combines an unemployment rate and the indices of free jobs. In most EU member states, the curve has shifted outside in recent years[2].

The recorded high unemployment rates among graduates raise doubts about the quality of academic education in the context of preparing students to professional work. A possible method of resolving the diagnosed problem of structural unemployment among the youth is the better integration of formal education with actual challenges that will be posed to new employees by entrepreneurs. To this purpose, the state-of-the-art forms of teaching are being deployed in the academic practice, aimed at providing graduates with characteristics necessary for finding one's place on the labour market effectively.

There is a growing focus on 'making teaching practical', and teaching tools that have been supporting this process are case studies, simulations, and business games embedded in the network and available online.

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[1] Data for UE-27 (Eurostat): the unemployment rate among persons below 25 increased from 15.7% (2007) to 22.9% (2012), with the EU country of the highest change dynamics in the period (Greece) experiencing the growth by 325 percentage points (to 55.4%)!

[2] *Roczna analiza wzrostu gospodarczego na 2013 r. Załącznik: Projekt wspólnego sprawozdania o zatrudnieniu*, Commission Announcement, European Commission, Brussels 2012, p. 16.

Against this background, a test project called Case Simulator has been implemented at Gdańsk University since 2011, which combines state-of-the-art methods of developing entrepreneurial attitudes among students such as business simulations and case studies.

Rationale for the *Case Simulator* project implementation

Reports prepared by institutions that monitor the Polish and Pomeranian labour market confirm the above-mentioned European trend. They also notice that candidates lack professional experience, which creates a major barrier to finding a job[3]. Moreover, the reports indicate with regard to promoting business initiatives that young organizations are not given sufficient support[4].

It can be assumed in the above light that a high percentage of young unemployed is related to the attitude to professional career that dominates in the social awareness, which imposes the stereotype of finding a full time job by youth. Thus working 'for' an entrepreneur becomes something natural, which reduces the tendency to establish one's own businesses or self-employment. Moreover, there are no effective tools to develop entrepreneurial attitudes among the young.

This leads to defining two basic problems that need to be resolved. The first can be analysed in a strategic perspective and expressed as: 'Teaching entrepreneurship focuses excessively on the transfer of theory about how to establish and run a business and contributes little to installing entrepreneurial attitudes, does not encourage to starting a business, and thus finding oneself on a labour market as an employer rather than as an employee'. On the other hand, in operational terms the problem to be resolved can be described as follows: 'Classes in entrepreneurship conducted during a course at a university lack the practical aspects and do not encourage to establishing businesses. Moreover, such classes are given mostly in courses related to economics, management, and tourism. Students of other courses have no such classes in their curricula'[5]. In this context, a solution could involve

[3] *Rynek pracy województwa pomorskiego w I półroczu 2011 r.*, Wojewódzki Urząd Pracy w Gdańsku, p. 8, http://www.wup.gdansk.pl/g2/2011_09/1cd6c025a300a54ce8d9ec97b30f5567.pdf [access: 01.03.2013] and *Rynek pracy województwa pomorskiego w I półroczu 2012 r.*, Wojewódzki Urząd Pracy w Gdańsku, p. 5, http://www.wup.gdansk.pl/g2/2012_10/da0af960a2e0c24d3aaf8ef793ca9f8f.pdf [access: 01.03.2013].

[4] *Jak wspierać rozwój przedsiębiorczości? Badanie mechanizmów wsparcia rozwoju przedsiębiorczości w Polsce oraz rekomendacje ich zmian*, P. Dobrowolski (ed.), Fundacja Initium, Warszawa 2011, p. 4, http://www.fundacjainitium.pl/uploads/file/Badanie_mechanizmow_wsparcia_rozwoju_przedsiebiorczosci_w_Polsce_final.pdf [access: 01.03.2013].

[5] *Studenci ostatniego roku szkół wyższych – pracodawcy, czy pracownicy? Potencjał do rozwoju przedsiębiorczości wśród studentów ostatnich lat studiów województwa pomorskiego*, Raport z badań ilościowych „Potencjał do rozwoju przedsiębiorczości wśród studentów ostatnich lat studiów województwa pomorskiego", Urząd Marszałkowski Województwa Pomorskiego, Gdańsk 2010, http://www.pomorskie.eu/res/pokl/Dokumenty/Raporty/raport_8.1.4_04_03.pdf. [access: 01.03.2013].

the introduction of innovative teaching methods with case studies and business simulations that present the operation of a business on a target market and solving actual problems that have to be faced by businesses that operate in a region.

The process of teaching subjects related to business has to involve a necessary element, which is often undervalued, of developing the knowledge and characteristics that are usually attributed to managers. A survey conducted among graduates of business schools confirmed that the most desired executive competences include the skill / ability to adapt to new tasks, take decisions, organise, and assess situations quickly[6].

Other research have shown explicitly that according to managers the most effective form of teaching are computer business simulations, which are perceived better than activating exercises, next in the ranking, followed by case studies and traditional lectures[7]. Moreover, it was demonstrated that each technique of knowledge transfer enables to develop individual competences in a different manner. According to practitioners, the answer to the question whey simulations are effective is very simple. The success of this method comes from several elements, the most important of which is the high level of realism, the opportunity to compete dynamically by taking interrelated decisions, clear depictions of dependencies and the focus on new ways of thinking[8].

Based on this background, this study will go on to presenting the objective and course of the Case Simulator project, which combines activities related to education with the use of state-of-the-art methods (simulations and case studies) targeted at developing entrepreneurial attitudes among students who are to enter the labour market soon.

Objectives and course of the *Case Simulator* project

The Case Simulator project is carried out under the patronage of the Voivodeship Job Centre in Gdańsk and the Department of Economics, Gdańsk University, in cooperation with the Pomeranian Regional Chamber of Commerce (a representative of employers) and Hochschule für Technik und Wirtschaft from Dresden (an international partner). It belongs to innovative testing projects in the 6th priority (Labour market available to all) of the Human Capital Operational Programme. The implementation of the project has been planned from September 2011 to September 2013.

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[6] D.T. Teach, G. Govahi, *The Role of Classroom Techniques in Teaching Management Skills*, "Simulation & Gaming" 1993, Vol. 24, pp. 429–455.

[7] See: J.N. Trapp, S.A. Koontz, D.S. Peel, C.E. Ward, *Evaluating The Effectiveness Of Role Playing Simulation And Other Methods In Teaching Managerial Skills*, "Developments In Business Simulation & Experiential Exercises" 1995, Vol. 22, p. 116.

[8] R. Adl, *Simulations: Why Are They Effective?*, "Human Capital Insights" 2010, October, p. 3.

Project objectives

The general aim is to raise the skills of 'developing entrepreneurial attitudes' among final-year's students, which is to translate into their improved position on the labour market, also as potential employers. The general aim will be achieved through the performance of detailed objectives. Such objectives include: developing skills of generating ideas (spontaneous innovation), handling actual economic problems, and developed self-confidence. Simultaneously, the quality of teaching means should improve (both in terms of form and content), which will result in the higher level of competences among teachers giving classes in entrepreneurship and aroused interest in classes among students.

The project concerns the introduction of innovative teaching methods such as case studies and business simulations into common use in academic teaching, the methods that illustrate the operation of businesses on the market in a realistic manner.

The work has been divided into two basic stages: preliminary and testing. The first one was related to establishing a diagnosis of the preparation of Gdańsk University students to take a job in the light of expectations held by employers, the preparation of premises for tools and the physical creation of custom-made case studies and a business simulation embedded in network. The second phase involved tests of the created tool on a group of 170 students from various departments of the Gdańsk University.

Preliminary work – diagnosis: students vs. employers report

The surveys of students and entrepreneurs carried out in the first phase of the project with in-depth interviews were aimed at identifying the readiness, in a broad sense, for taking a future job and the possibilities of developing skills that are included in the concept of entrepreneurship. Another objective was to get these groups involved in the process of creating an innovative solution and to find out more about future users of innovative solutions. The conducted interviews enabled to reach the following conclusions:

1. A vast majority of surveyed students declared their readiness to supplement knowledge and broaden skills in economic sciences, in particular entrepreneurship.
2. In most cases students indicated that higher education does not prepare to operate independently. Moreover, they pointed to the insufficient number of practical classes, the excessive volume of theory in the curriculum, the inadequate use of theory, and the inability to use it in the reality of market conditions as the main causes of the situation.
3. As many as 79% interviewed students claimed that their courses did not support self-reliance. Even though as many as 92% respondents indicated that universities did prepare to teamwork, only 42% answered that they

were taught how to take decisions independently. 58% respondents concluded that the shortage of such preparation resulted from insufficient opportunities to practice how to take managerial decisions during courses, the shortage of knowledge and experience. In their opinion, this shortage stems from the inadequate number of practical classes they had to attend during their courses. Moreover, students claimed that the skill was developed only during professional work, while universities did not prepare for being independent.

4. 67% respondents said they were willing to establish their own business in the future. This percentage is similar to the result among extramural students. This coincidence is also confirmed with the study of determinants of establishing a business, where most respondents checked the answer 'own experience' (42% responses) and only 21% indicated 'higher education'. Acting self-reliantly by establishing and running a business remains the area that is something difficult and unknown for students, something they have no contact with during their studies.
5. Students had a much better opinion of their theoretic preparation for work than their practical readiness.

In parallel, in-depth interviews were conducted among 24 representatives of businesses from various sectors in the Pomorskie Voivodeship.

1. In most cases, the entrepreneurs indicated that higher education courses did not prepare to act independently (79%), which coincided with the responses given by students.
2. A definite majority of entrepreneurs were eager to accept students for practical placements (79%), while they considered the number of obligatory placements during courses to be insufficient (88%). Moreover, 100% respondents accepted the simultaneous work and studies. At the same time, 80% respondents claimed that university courses did not prepare for being responsible for one's own work.
3. Entrepreneurs had a much better opinion of the theoretic readiness of students for professional work than of their practical skills. As regards theory, 71% respondents said that the preparation for work was good, but as many as 59% considered graduates to be 'prepared insufficiently for professional work in practical terms', while only 29% as well-prepared.
4. Finally, entrepreneurs indicated the issues that were most problematic to students. The following groups of competences prevailed: organising one's own work, taking decisions alone (87% respondents said that graduates had a problem with taking decisions independently), sales skills, and the practical use of acquired knowledge.

The analysis of teaching offer presented by universities conducted by the project team confirmed the conjecture that most subjects that concern entrepreneurship are taught in so-called business courses and at private universities and colleges. As a consequence, the access of students of technical, social, and humanistic courses to such skills is limited. On the one hand, this situation closes

a large number of professional paths to such students and, on the other hand, creates a major barrier to the development of one's entrepreneurial spirit.

The underlying thesis of the project is the claim that the unemployment among the young people should be reduced not by increasing the ability to find work 'for someone' but the process should be developed of creating among the students the faith in their own power and developing innovative attitudes, in particular by overcoming unemployment through self-employment. Such qualities cannot be developed by limiting the education to reading books only. Instead, practical skills have to be developed in resolving problems through handling them by oneself, e.g. with suitably designed business simulations and case studies.

Preliminary work – the stage of producing simulations and case studies

Being aware of the situation on the labour market in Pomorskie Voivodeship as well as the expectations of students and employers, the production was launched of two tools: teaching case studies (i.e. custom-made for students and referring to the problems of a 'young' business that starts operating in Pomorskie Voivodeship) and a business simulation embedded in the network.

The business simulation is based on the solutions and experiences of the international partner, which provided an innovative training tool. The preliminary stage of developing the tool involved the in-depth interviews with entrepreneurs and students. The results of the surveys and the outcome of the study visit in Germany enabled to make a selection in the 'product-service' category and the 'sector' category that were to be simulated. Due to the profile of the Polish market and the financial capacities of university graduates, the simulation game and the case studies were created for the service sector, which does not require such high financial outlays as the production industry. Moreover, due to the attractiveness and the potential knowledge of services among students (from the customer's point of view), fitness services were chosen, i.e. opening and running a club offering fitness services. The creation of the business simulation involved also a buyer procedure model, in order to indicate the basic determinants followed by buyers, as well as a business model that provides for creating added value on the market. The model takes account of the complexity of decision processes, including the problems resulting from areas such as the macro- and microeconomic environment, management, finance, marketing, human resource management, and sales. The models were the basis for developing a decision-making algorithm. Next, the models developed in this way were implemented in the Internet environment, to provide remote access to the software that was prepared especially to address the above-mentioned needs. Instruction films were attached to the simulation with guidelines on what the most important elements were in running a real business. The created platform made it

possible to conduct numerous games simultaneously; therefore, it can be used to conduct training for different groups at the same time. Each game may be 'personalised', i.e. a trainer chooses the level of difficulty that is suitable for the competences of trainees.

In order to enable the deepened problem analysis of the market assessment, the behaviour of buyers, and financial issues, 10 case studies were prepared. All of them were consistently embedded in the market realities of Pomorskie Voivodeship, namely its demand categories, supplies, prices and non-price elements (e.g. demographic). The content was closely related to the business simulation. Due to the groups of target users and receivers of two final products, mostly students of non-economic courses, a decision was taken during the preparation of the case studies to extend their content with glossaries of the most important economic terms, enclosed to every case study, as well as the basic rules of SWOT and PEST analyses. Furthermore, a decision was taken during the preparations to develop a guidebook including so-called teaching notes, which should support the work of instructors, being an added value compared to the preliminary assumptions.

Testing solutions

The phase of testing continued for 5 months (1 semester). The target group of users was made of all lecturers who were interested in implementing innovative methods of entrepreneurship teaching. The so-called target group testing the design comprised 12 lecturers representing 11 departments of the University and 170 students of the same departments. 11 groups were formed consisting of 15–17 persons each.

At the testing phase, all users received a simulation guideline, a copied set of 10 case studies including a description of basic terms applied in case studies with the possible solution scenarios. The materials were given to the users gradually, which prevented the premature learning of the whole content of classes. Moreover, users received access to the Internet platform with the simulation (login/password on a website). Instructors were provided with teaching manuals related to the subject of starting and running a small business and the simulation manual.

The phase of testing the product comprised 40 classes (for each group) dedicated to case studies and 80 hours of online work with the simulation.

Efficiency verification

Verifying the efficiency of proposed tools is an important element of the project in terms of scientific objectives. The verification will take place concurrently. One of the verification methods will be to test the achievements of students who

have participated in the project (tests of knowledge at the beginning and upon completion of the project, questionnaires about the acquisition of entrepreneurship competences, the ability to generate new ideas, handling actual economic problems and self-confidence). The second method of testing the efficiency of proposed solutions will be an open entrepreneurship competition organised together with the partner, the Pomeranian Regional Chamber of Commerce. It will involve a group of students participating in the classes given within the project and a similar number of students who were not involved in the project (a control group). This approach will make it possible to verify if the proposed solutions contribute to the development of knowledge and skills in entrepreneurship.

Summary

The use of business simulations and case studies method that present the operation of a business on a target market, and thus resolving real problems faced by entrepreneurs in the region, facilitates the practical use of the acquired knowledge. Developing skills that are considered to be executive characteristics, such as the ability to produce ideas, reacting flexibly to changes, identifying opportunities and threats, and developing self-confidence, will develop entrepreneurial attitudes among the youth and encourage them to launch their own businesses, which is a starting point for improving their position on the labour market and contributes to active self-employment.

Chapter 8

An analysis of students' pro-entrepreneurial attitudes and dispositions

Introduction

(A. Poszewiecki)

It was decided that the tool for participant recruitment in the Case Simulator project would be an entrepreneurial skills test. People wishing to participate in the project had to solve the test titled: TEST FOR THE BEST. EUROPEAN SKILLS ACHIEVEMENT CONTEST, designed for higher education facilities to check how well these facilities' curricula are suited to business needs. This tool was developed within the framework of Skills for the Future project, run by the following organisations: Instytut Badań nad Demokracją i Przedsiębiorstwem Prywatnym (Poland), Gesto Total e Inovaçio Empresarial – GTIE Consultores S.A.(Portugal), E.Ri.Fo. (Italy) and AHI EVRAN ÜNIVERSITESI (Turkey). Students were faced with 20 decision making situations, which people conducting a business activity encounter. The test consisted of both open-ended and closed questions.

213 persons (N = 213), over 60% (129 persons) of whom were women, and nearly 40% (84 persons) were men, took the test. The students taking the test were representatives of all the faculties of the University of Gdańsk. Conducted on such a numerous and diverse group, the test allowed for a few analyses on the students' entrepreneurial (managerial) skills. Moreover, a test on knowledge of economy-related issues was conducted among nearly all the people interested in project participation. The idea behind this test consisted in verifying to what extent knowledge of economy, and entrepreneurial skills are correlated.

Students who applied for project participation were examined in terms of their pro-entrepreneurial attitudes and dispositions. The analysis was performed based on the average, with the use of significance tests. All the questions were developed on the basis of a five degree scale: absolutely disagree, disagree,

neither agree nor disagree, agree, absolutely agree. The following analysis was prepared based on three core variables, i.e. gender, studies cycle and faculty.

Entrepreneurial skills analysis
(A. Poszewiecki)

Firstly, it was checked whether it was possible to use a parametric test to compare the groups' average values (T-student's test for two groups, and ANOVA one-way analysis for a larger number of groups), i.e. the normality of test results distribution throughout groups and variance homoscedasticity. If making use of these assumptions was not feasible, non-parametric tests were applied (Mann-Whitney U test for two groups, and Kruskal-Wallis ANOVA test for a larger number of groups).

Average results obtained in various faculties were compared first and Figure 17 depicts this analysis.

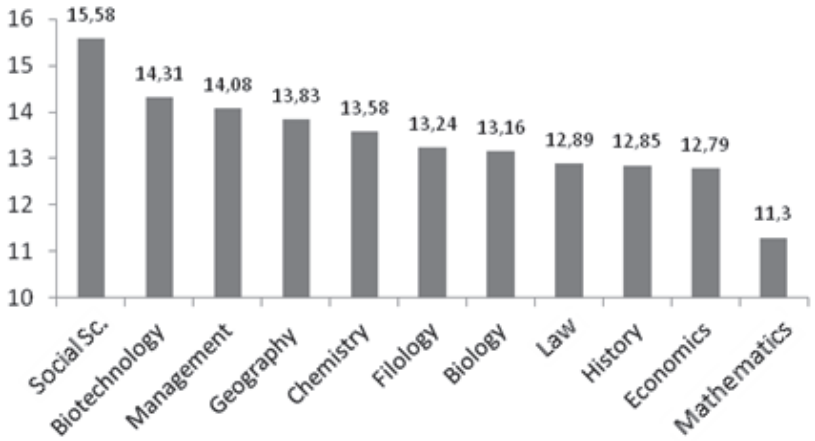

Figure 17. List of average values obtained in the entrepreneurial skills test in particular faculties

Source: Own elaboration.

As the Figure above shows, the leaders turned out to be students of the Faculty of Social Sciences, who achieved nearly 9% better results than those achieved by Biotechnology or Management students. The students of the Faculty of Mathematics, Physics and Informatics scored lowest, and their score was 13% lower than that of the Faculty of Economics students' who took the penultimate position.

Variance analysis
(A. Poszewiecki)

Due to lack of variance homoscedasticity (answer variances in faculties differed significantly), which was proven using Bartlett's test ($p = 0.013$), various faculties' test results were compared using Kruskal-Wallis ANOVA test. Kruskal-Wallis ANOVA test indicated a statistically significant difference in test results distribution depending on the faculty ($p = 0.001$). The test results distribution including the maximum and minimum values, as well as median is presented in the Figure below (particular bars signify, starting from top: maximum, upper quartile, median, lower quartile, and minimum).

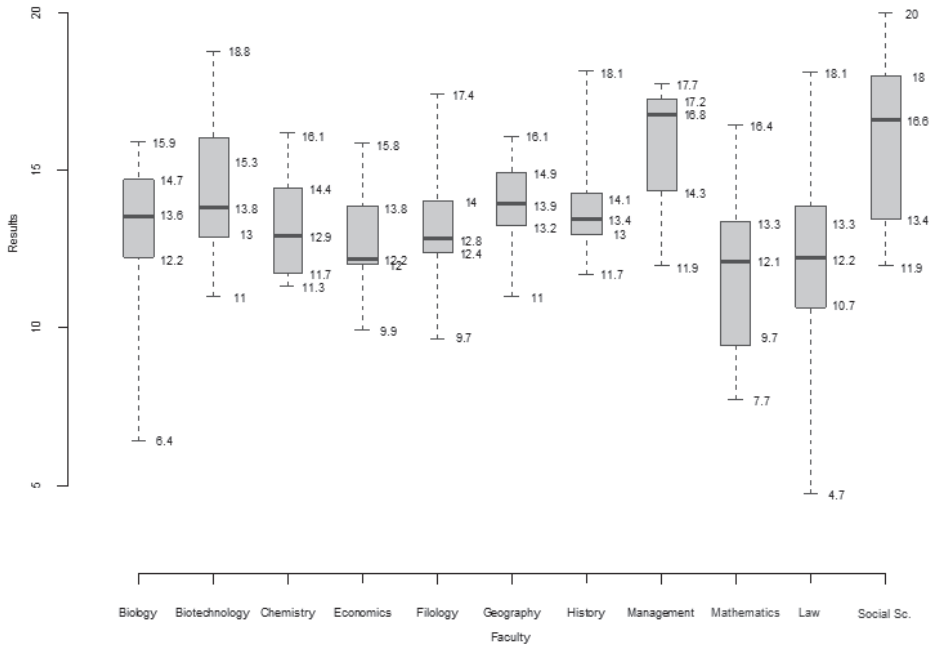

Figure 18. Distribution of results obtained in various faculties

Source: Own elaboration.

A post hoc test was applied following Kruskal-Wallis ANOVA test, to check which faculties impact on the significance of Kruskal-Wallis ANOVA test result. Three statistically significant differences were reported at 0.05 significance level:

- Biotechnology – Mathematics, Physics, Informatics,
- Oceanography, Geography – Mathematics, Physics, Informatics,
- Social Sciences – Mathematics, Physics, Informatics.

General result analysis according to gender
(A. Poszewiecki)

The results obtained in the entire group were analysed according to gender. In this case, t-student test assumptions (distribution normality, homoscedasticity) are satisfied, thus the test may be applied. T-student test did not indicate any statistically significant difference in test results distribution according to gender ($p = 0.598$).

Cluster analysis
(A. Poszewiecki)

In statistics, the term cluster usually denotes a set of "similar" observations, where observations belonging to two different clusters should differ from each other significantly. The objective of *cluster analysis* is to organise the observed data into meaningful structures or groups through similarity analysis within the areas under study. Similarities between objects are defined based on a relevant indicator, similarity measure, or distance measure. This type of analysis is used to create a group of objects whose elements will be as similar to one another as possible (in terms of selected features), yet will simultaneously be maximally different from other groups' elements[1].

The objects are divided by means of two actions: calculating the distance matrix (between regions) and object stepwise selection according to their distance. Distances between faculties were calculated using Euclidean metric (distance) (primarily due to its greatest popularity). Using the calculated distance matrix, a procedure of merging particular faculties was later performed. Ward's method, used to find dense, spherical clusters, was applied here.

This method makes use of variance analysis approach to assess distances between object clusters which exist in n-dimension space (where n is a number of diagnostic variables). So, this method aims to minimize the sum of squares of any two clusters, which may be formed at any stage. This method is generally perceived as a very efficient one, although it aims to create small clusters. Using this method, two clusters are merged when they provide a minimum sum of squares of all elements' deviations from clusters' centroids[2]. The criterion of cluster merging (*error sum of squares*) may be reflected using the following formula:

[1] More on cluster analysis: T. Marek, *Analiza skupień w badaniach empirycznych. Metody SAHN*, PWN, Warszawa 1989.

[2] More on the topic: J. Parysek, *Analiza skupień jako metoda klasyfikacji w geografii*, [in:] *Metody taksonomiczne w geografii*, Z. Chojnicki (ed.), PWN, Warszawa–Poznań 1980, pp. 87–99.

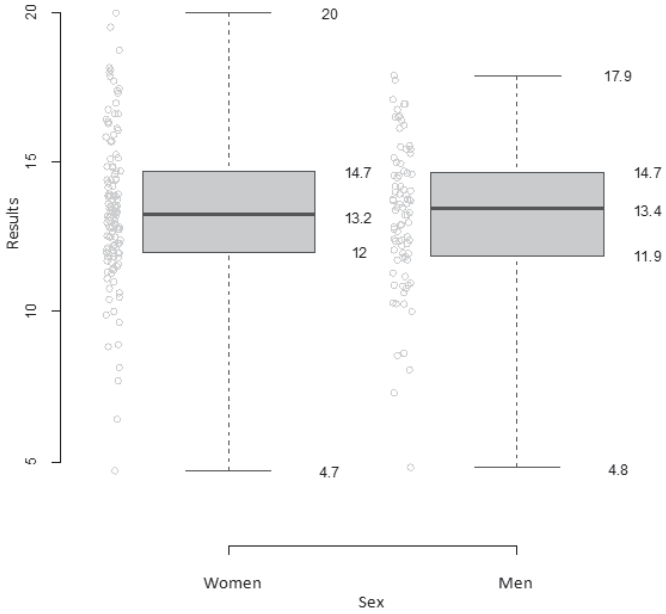

Figure 19. Results distribution throughout the whole tested group (women vs. men)

Source: Own elaboration.

$$E.S.S. = \sum_{i=n}^{n} x_i^2 - \frac{1}{n}\left(\sum_{i=1}^{n} x_i\right)^2$$

E.S.S. – Ward's criterion;
x_i – deviation *i*-of this point ($i = 1, 2, \ldots, n$) from x centroid.

Ward's hierarchical cluster analysis (minimum variance method) was applied in this study. A test result average was allocated to each faculty. Subsequently, Euclidean distances between the test average values were calculated for particular faculties. These distances were subsequently used to employ Ward's method. A starting point for the analysis was to approach each faculty as a separate cluster. Subsequently, the clusters were merged to form one in order to minimise the cost function, which depends on the distance between clusters. As a result, the clusters as reflected in the figure below emerged.

Three main clusters have been distinguished. One of them comprises the students of the Faculty of Mathematics, Physics and Informatics. The next cluster is WNS (Social Sc.), Biotechnology, Chemistry, as well as Oceanography and Geography. The third group is the Faculties of Biology, Languages, Economics, History, as well as Law and Administration. A clear explanation of why such clusters emerged is hard to find in this case.

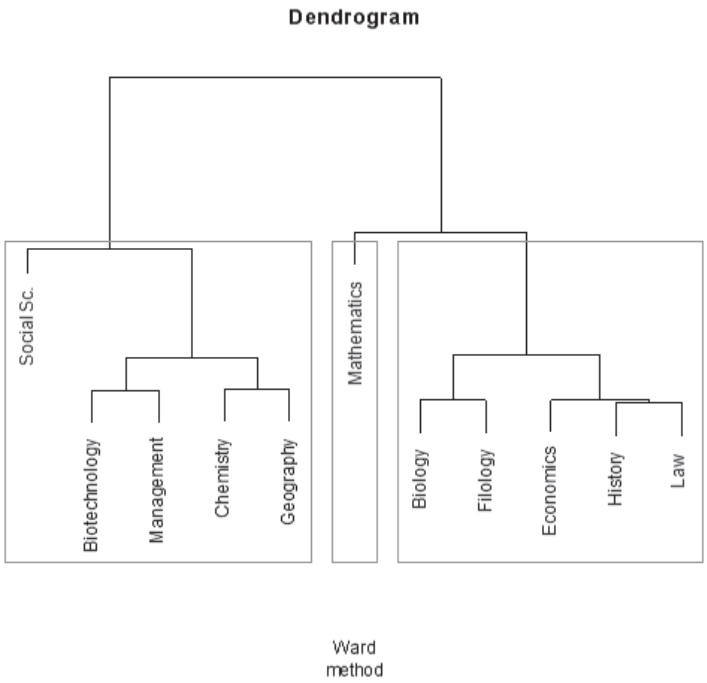

Figure 20. Clustering results (skills)

Source: Own elaboration.

Job expectations (place)
(P. Szulc-Fischer)

Subsequent studies were connected with students' attitudes, with job expectations of Gdańsk University students being one of the analysed issues. The interviewees were asked to express their opinion on the following statements:

1. I would like to work abroad even if the job was below my formal qualifications.
2. I am only interested in working in Poland.
3. I am primarily interested in conducting my own business activity, and not in a regular post.
4. I am primarily interested in working for a small company, e.g. a family run one (owned by my own family or not).
5. I am primarily interested in a permanent post, working for a large company or a corporation.
6. I am primarily interested in working in a government office or a non-business institution.

The answers to the first question: *I would like to work abroad even if the job was below my formal qualifications,* offered by Bachelor's degree third grade students differ from those offered by Master's degree students. While the first group represents a neutral attitude towards working abroad, even below their formal qualifications, the second group would not wish to take such a job (Bachelor's degree students average: 2.67, Master's degree students average: 2.24). With the trust level assumed ($\alpha = 0.95$), the difference between the responses of particular groups is statistically significant ($t = 2.82$, $p = 0.00$).

Analysing the next question: *I am primarily interested in conducting my own business activity, and not in a regular post*, it is worthwhile to pay attention to the fact that it is mostly the students of the Faculties of Management and Social Sciences that would like to conduct their own business activity. They display a beyond-average interest in conducting business activity, which hints at more frequently declared than averagely reported pro-entrepreneurial attitudes. Simultaneously, the students of the Faculty of Chemistry and Faculty of Languages are the least interested in this form of professional activity. The distribution of answers to question two is depicted in Figure 21.

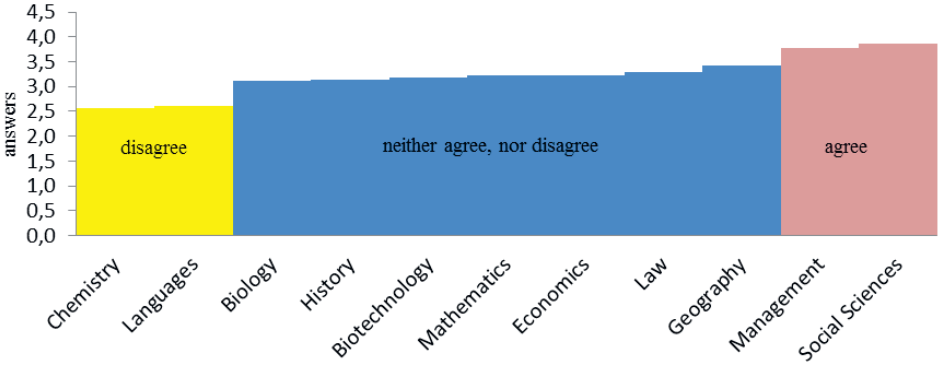

Figure 21. Answers of particular faculties' students to the question: I am primarily interested in conducting my own business activity, and not in a regular post

Source: Own elaboration.

Students' replies to the question: *I am primarily interested in working for a small company, e.g. a family run one (owned by my own family or not)*, have revealed that many of them are not interested in such a job. At the same time, these persons often demonstrated interest in working for a large corporation. These were primarily the students of the Faculty of Biotechnology, Faculty of Chemistry, Faculty of Languages, Faculty of History, and Faculty of Law and Administration belonging to the group of the so-called non-business faculties. Students of the Faculty of History who said they were interested in working for neither a small company nor a large corporation constitute an exception. The results of the test pertaining to the matter under discussion have been presented in Figure 21.

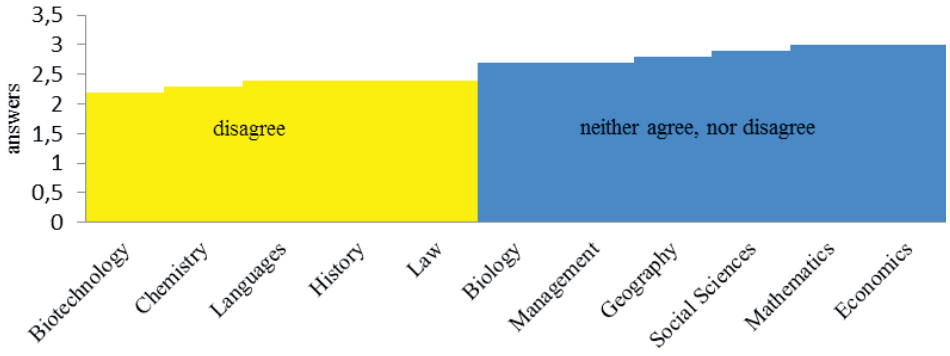

Figure 22. Answers of particular faculties' students to the question: I am primarily interested in working for a small company, e.g. a family run one (owned by my own family or not)

Source: Own elaboration.

A gender-related analysis of the question: *I am primarily interested in working in a government office or a non-business institution*, shows that men did not express interest in working in a government office or a non-business institution (average = 2.15). Women, on the other hand, maintained a neutral attitude to the workplace in question (average = 2.83), which translated into a statistically significant difference between these two subgroups (t = -4.87; p = 0.00).

Table 8. The distribution of men's and women's replies to the question: I am primarily interested in working in a government office or non-business institution

Average men	Average women	t	p	Standard deviation men	Standard deviation women
2.15	2.83	-4.87	0.00	1.03	0.96

Source: Own elaboration.

Analysing the replies according to faculties, it was noticed that a portion of students would not wish to work in a government office or a non-business institution. The lowest level of interest in such a job was expressed by the Faculty of Management (average of 1.89), Faculty of Social Sciences (average of 2.00), Faculty of Chemistry (average of 2.33) and the Faculty of Biotechnology (average of 2.39). The distribution of replies is depicted in Figure 23.

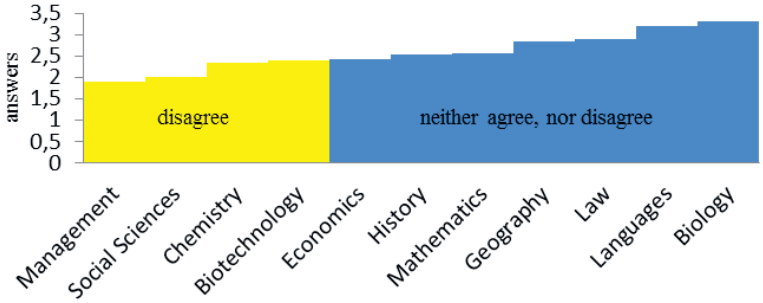

Figure 23. Answers of particular faculties' students to the question: I am primarily interested in working in a government office or a non-business institution

Source: Own elaboration.

Job expectations
(P. Szulc-Fischer)

The aim of this section of the study was to specify the influence of factors determining interest in a particular job. In order to characterise these elements better, students were asked to express their opinions on seven factors:

1. For me, the most significant factor in choosing a job is remuneration.
2. For me, the most significant factor in choosing a job is convenient non-financial employment conditions.
3. For me, the most significant factor in choosing a job is atmosphere and colleagues.
4. For me, the most significant factor in choosing a job is the general opinion on the company.
5. For me, the most significant factor in choosing a job is the distance from my place of residence.
6. For me, the most significant factor in choosing a job is the possibility of being promoted quickly.
7. I will take any job after I graduate, even though the conditions may be unattractive.

Based on the answers average values, factors which are considered the most important by a given group have been identified. The most important conclusions have been presented in Table 9.

The responses obtained indicate that the factor of *For me, the most significant factor in choosing a job is remuneration* was mostly indicated as significant by men (average of 3.54). For the sake of comparison – an average value for women's replies was at 3.46. T statistic values show that the differences obtained are not statistically significant ($t = 0.52$, $p = 0.60$). It is also worth noticing that the question: *For*

me, the most significant factor in choosing a job is convenient non-financial employment conditions was positively answered by women, as opposed to men. All students, irrespective of gender, considered atmosphere and colleagues significant factors.

Table 9. Men's and women's replies concerning job expectations

Factor	Woman			Man		
	Influence					
	poor	neutral	strong	poor	neutral	strong
Remuneration		X				X
Non-financial employment conditions			X		X	
Atmosphere and colleagues			X			X
General opinion on the company		X			X	
Distance from the place of residence		X			X	
Possibility of being promoted quickly		X				X
A job consistent with qualifications, even though the conditions may be unattractive		X			X	

*answers average: poor <1 ; 2.50>, neutral (2.50 ; 3.50>, strong (3.50 ; 5>

Source: Own elaboration.

Moreover, it is worth noticing that for the majority of men the most significant factor in choosing a job is the possibility of being promoted quickly (average of 3.57). Women's average, on the other hand, was at 3.29 showing statistically significant discrepancies between the responses ($t = 2.13$, $p = 0.03$).

Table 10. Master's and Bachelor's degree students' responses concerning job expectations

Factor	Bachelor's degree students			Master's degree students		
	Influence					
	poor	neutral	strong	poor	neutral	strong
Remuneration			X		X	
Non-financial employment conditions		X				X
Atmosphere and colleagues			X			X
General opinion on the company		X			X	
Distance from the place of residence		X			X	
Possibility of being promoted quickly		X			X	
A job consistent with qualifications, even though the conditions may be unattractive		X			X	

*answers average: poor <1 ; 2.50>, neutral (2.50 ; 3.50>, strong (3.50 ; 5>

Source: Own elaboration.

The answers, when analysed in terms of studies cycle, show that the majority of students of third grade Bachelor's degree studies declared that remuneration was the most important factor for them when choosing a job (3.56). An average value for students of the ultimate grade of Master's degree studies was 3.40. The difference between the groups is statistically significant ($t = 1.15$, $p = 0.25$).

There occur statistically significant differences in answers considering the second factor i.e. non-financial employment conditions. Master's degree students (average of 3.67) stressed the importance of this factor more frequently than Bachelor's degree students (average of 3.37).

An analysis of the results according to particular faculties, has led to an observation that remuneration is especially significant for a larger group of students. This attribute was especially stressed as being important by the students of the Faculty of Biology and Faculty of Mathematics, Physics and Informatics. It is worth stressing that people with a neutral attitude to remuneration as a primary job choice determinant include students representing business disciplines. A comparison of non-financial employment conditions and remuneration as factors influencing a job choice is shown in Figure 24.

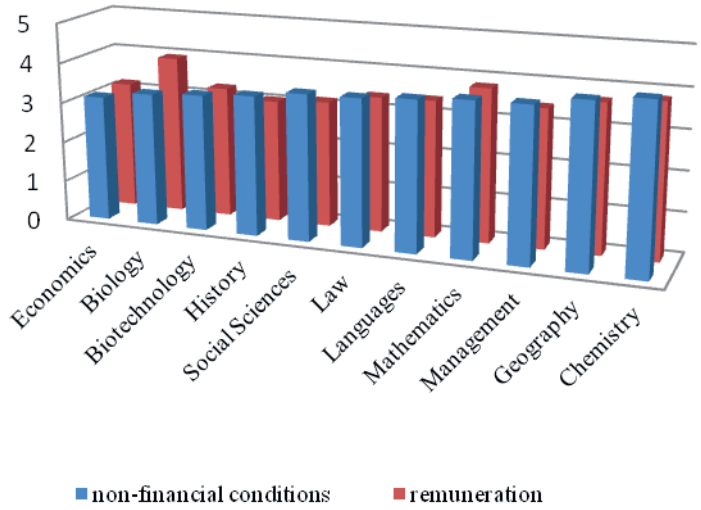

Figure 24. A comparison of non-financial employment conditions and remuneration as factors influencing a job choice

Source: Own elaboration.

The answers selected by particular faculties students show that solely the students of the Faculty of Economics (average of 3.13) and the Faculty of Biology (average of 3.33) admit having a neutral attitude towards the factor of atmosphere at work. The remaining faculties indicated this factor as an important one.

The question pertaining to distance from work to the place of residence divided the faculties under study into three groups. Distance from work is not relevant for the students of the Faculty of Social Sciences (average of 2.21), Faculty of Management (average of 2.39), or Faculty of Biotechnology (average of 2.44). There was only one group i.e. the students of the Faculty of Mathematics, Physics and Informatics to admit that distance mattered to them in choosing a job (average of 3.52). The results are presented in Figure 25.

Moreover, a significant factor for the survey participants is the possibility of being promoted quickly. This was the answer provided by the students of the Faculty of Management (average of 3.61), Faculty of Law and Administration (average of 3.32) and Faculty of Mathematics, Physics and Informatics (average of 3.85).

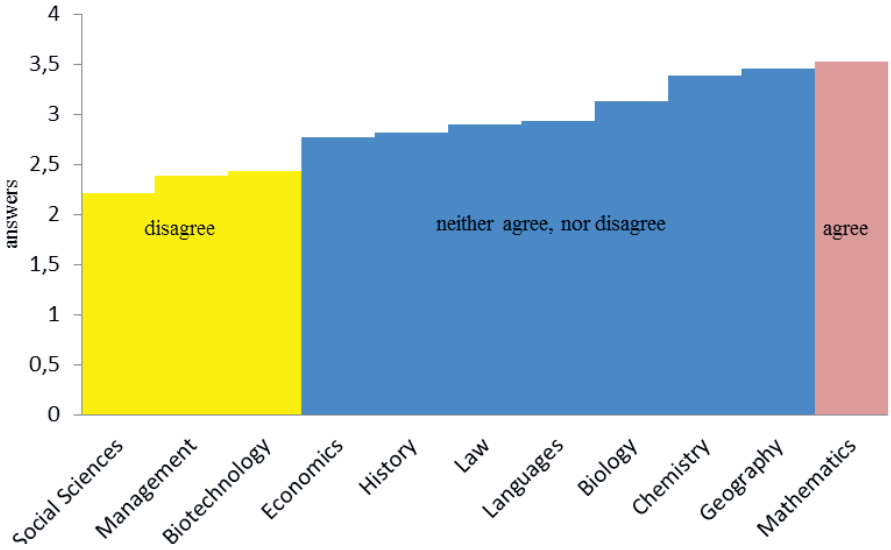

Figure 25. Answers of particular faculties' students to the question: For me, the most significant factor in choosing a job is the distance from my place of residence

Source: Own elaboration.

Entrepreneur perception
(P. Szulc-Fischer)

An analysis of entrepreneur perception-related issues was performed on the basis of student's answers to the following questions:

1. The term entrepreneur evokes negative associations in my mind (fraud, thief etc.).
2. Being an entrepreneur enhances social prestige more than being a lawyer.

3. An efficient entrepreneur is a positive role model for me to a greater extent than a doctor.
4. I would much rather be an independent entrepreneur than a manager in a government institution.
5. My parents would be happier if I had a regular post, rather than ran my own business.

The answers to the first question *The term entrepreneur evokes negative associations in my mind (fraud, thief etc.)* provided by survey participants show that the above statement does not hold true for any of the groups. Therefore, one may say that an entrepreneur is viewed positively by the students.

Substantial differences emerged among the answers of survey participants to the question: *An efficient entrepreneur is a positive role model for me to a greater extent than a doctor*. The only ones to confirm that an efficient entrepreneur was a positive role model were the students of the Faculty of Management i.e. of a so-called business faculty (average of 3.56). The Faculties of Biology and Languages held an opposite view.

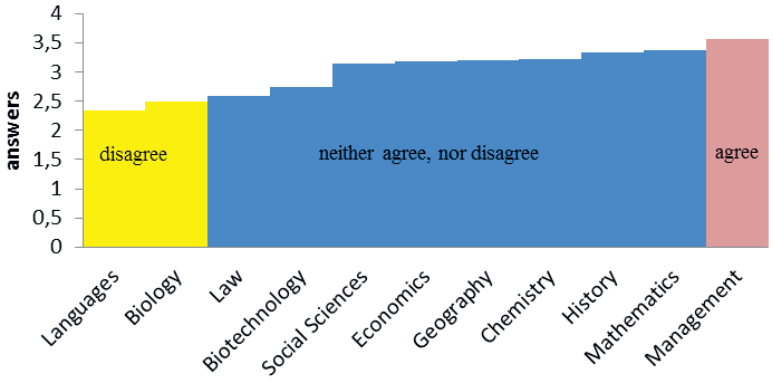

Figure 26. Answers of particular faculties' students to the question: An efficient entrepreneur is a positive role model for me to a greater extent than a doctor

Source: Own elaboration.

The answers analysed according to gender lead to the conclusion that men would rather be independent entrepreneurs than managers of a government institution (average of 3.85). An average number of women who opted for running their own business was 3.36 showing statistically significant discrepancies between the answers.

It is worth minding that the division according to discipline studied showed that students of the following faculties would like to be independent entrepreneurs:

– Management (average of 4.17);
– Social Sciences (average of 3.86);

– Oceanography and Geography (average of 3.96);
– Economics (average of 3.53);

It is worth emphasising that apart from business disciplines (which, by definition, should manifest a pro-entrepreneurial attitude), the said group comprises such disciplines as Geography and Social Sciences, which indicates a significant role of entrepreneurial education and development of entrepreneurial spirit in the students of all faculties.

Entrepreneur's qualities
(P. Szulc-Fischer)

The aim of this section of the study was to analyse the ways in which an entrepreneur is perceived. Students were asked to express their opinion on eight statements describing entrepreneur's qualities and skills, not always considered positive, i.e. diligence, desire to make a profit, being ruthless, sense of responsibility for their personnel, risk taking ability, limited trust in business partners, long-standing experience, good organisational skills. The answers are presented in Table 11.

On the basis of the answers obtained, a *good* entrepreneur characteristics may emerge. Both men, and women indicated that an entrepreneur should be characterised by diligence, sense of responsibility for their personnel, better organisational skills than in most employees; all of them thought that an entrepreneur does not need to have long-standing experience. The only difference occurring between the groups was one concerning trust in business partners, where men admitted a *good* entrepreneur should have limited trust in business partners.

Comparing students' answers, taking the matter of their studies into account, it has been noticed that nearly everyone said a *good* entrepreneur should have the following qualities:

– diligence;
– sense of responsibility for their personnel;
– better organisational skills than most employees;

Additionally, Bachelor's degree students admitted that an entrepreneur should have limited trust in their business partners. For senior students it was crucial that an entrepreneur was not ruthless in business. Moreover, it is worth noticing that for Master's degree second grade students, having experience did not translate into being a *good* entrepreneur.

Table 11. The distribution of men's and women's answers pertaining to qualities of an entrepreneur

Factor	Woman			Man		
	Influence					
	poor	neutral	strong	poor	neutral	strong
I think a good entrepreneur should primarily be characterised by diligence.			X			X
I think a good entrepreneur should primarily be characterised by a desire to make a profit.		X			X	
I think a really good entrepreneur must be ruthless in business.		X			X	
I think a good entrepreneur should primarily be characterised by a sense of responsibility for their own personnel.			X			X
I think a really good entrepreneur should be characterised by the ability to take excessive (as seen by an average person) risks.		X			X	
I think a good entrepreneur should have very limited trust in business partners.		X				X
I think a really good entrepreneur must have long-standing professional experience.	X			X		
I think a good entrepreneur is better organised than most employees.			X			X

*answers average: poor <1 ; 2.50>, neutral (2.50 ; 3.50>, strong (3.50 ; 5>

Source: Own elaboration.

Table 12. Master's and Bachelor's degree students' responses pertaining to entrepreneur's qualities

Entrepreneur's qualities	Bachelor's degree students			Master's degree students		
	Influence					
	poor	neutral	strong	poor	neutral	strong
I think a good entrepreneur should primarily be characterised by diligence.			X			X
I think a good entrepreneur should primarily be characterised by a desire to make a profit.		X			X	
I think a really good entrepreneur must be ruthless in business.		X		X		
I think a good entrepreneur should primarily be characterised by a sense of responsibility for their own people.			X			X
I think a really good entrepreneur should be characterised by the ability to take excessive (as seen by an average person) risks.		X			X	
I think a good entrepreneur should have very limited trust in business partners.			X		X	
I think a really good entrepreneur must have long-standing professional experience.		X		X		
I think a good entrepreneur is better organised than most employees.			X			X

*answers average: poor <1 ; 2.50>, neutral (2.50 ; 3.50>, strong (3.50 ; 5>

Source: Own elaboration.

It is interesting to observe that the question: *I think a good entrepreneur should primarily be characterised by a desire to make a profit* was negatively answered by the students of the Faculty of Management (average of 2.41) and Faculty of Languages (average of 2.33). It is worth minding that these are faculties offering radically different disciplines. A parallel situation was observed in the distribution of answers to the question pertaining to risks taken by an entrepreneur (Figure 27).

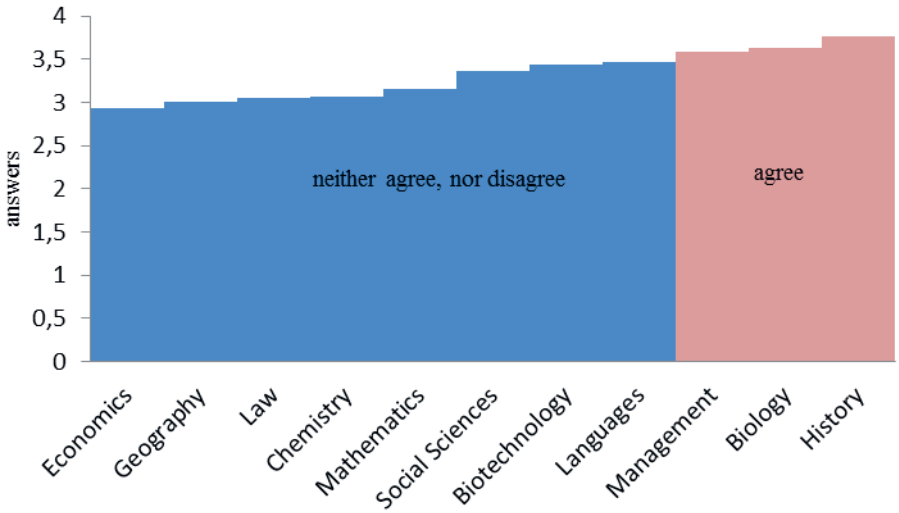

Figure 27. I think a really good entrepreneur should be characterised by the ability to take excessive (as seen by an average person) risks

Source: Own elaboration.

The students representing the following disciplines from the realm of humanities sharply disagreed with the statement of: *I think a really good entrepreneur must be ruthless in business*: Languages, (average of 2.20), Social Sciences (average of 2.21) and History (average of 2.33).

Moreover, the answers to the question: *I think a really good entrepreneur must have long-standing professional experience* showed that no faculty representatives consider experience to be a crucial feature of a *good* entrepreneur. The following faculties represent a different view: Faculty of Management (average of 2.38), Faculty of Biology (average of 2.19), Faculty of Social Sciences (average of 2.29) and Faculty of Oceanography and Geography (average of 2.12).

Self-assessment of the level of skills and knowledge conducive to operating a business
(W. Bizon)

The next section of the study is an attempt at examining two vital issues related to commencing one's own business activity by young people starting their career. The first of those was a self-assessment of one's own skills which are considered important and useful for running a business. Another issue was a declared level of knowledge connected with the first steps taken in a currently created company.

An attempt at a comprehensive presentation of one's own skills considered crucial and useful for running a business, as well as of the level of knowledge connected with the first steps taken in a currently created company may be developing scales consisting of questions related to those two areas. Therefore a measure based on questionnaires to test declarations of various UG faculties students was used, and scales characterised by an acceptable level of validity and reliability were created[3].

Likert five grade scale was employed to create questions for the questionnaire. Each question was allocated a choice of one of the following options: (1) absolutely disagree, (2) disagree, (3) neither agree nor disagree, (4) agree, (5) absolutely agree. The questionnaire's structure is reflected in Table 13.

Table 13. Questionnaire testing the level of declared level of crucial skills useful for operating a business (UM) and declared level of knowledge connected with the first steps taken in a currently created company (W)

Symbol	**Question**	**Possible answers**: (1) absolutely disagree (2) disagree (3) neither agree nor disagree (4) agree (5) absolutely agree
Scale (*skills*) UM		
UM_1	I have all the essential features of a good entrepreneur	(1) (2) (3) (4) (5)
UM_2	I think I am characterised by courage	(1) (2) (3) (4) (5)
UM_3	I think I am characterised by the ability to take risks	(1) (2) (3) (4) (5)
UM_4	I think I have good communication skills	(1) (2) (3) (4) (5)
UM_5	I have considerable professional experience	(1) (2) (3) (4) (5)
Scale (*knowledge*) W		
W_1	I know how to obtain initial capital	(1) (2) (3) (4) (5)
W_2	I know how to obtain indispensable subsidies	(1) (2) (3) (4) (5)
W_3	I know the essential necessary procedures connected with establishing business activity	(1) (2) (3) (4) (5)
W_4	I know the environment an enterprise might operate in	(1) (2) (3) (4) (5)

Source: Own elaboration.

The validity and reliability of the proposed test was evaluated by a test which covered a group of 214 last grade students (first or second cycle studies) of the

[3] More on validity of measures connected with training efficiency in: W. Bizon, *Trafność i rzetelność pomiarów poprzedzających badanie efektywności szkoleń e-learningowych*, "E-mentor" 2010, No. 5.

University of Gdańsk. It may be assumed that the group consisted of a sufficient number of participants and was appropriate for the purpose of these analyses[4].

Development of verification tools

The validity of performing a factor analysis via distinguishing the principal components for *skills* scale is proven by the results of Bartlett's Test of Sphericity and KMO factor value. The test resulted in $chi^2 = 238.3$ (df = 10 p = 0.00) statistic value, which allows for accepting the hypothesis that the data may be used to perform a factor analysis. KMO value of 0.77 is higher than an assumed threshold value. The factor analysis performed for *skills* scale has led to distinguishing one factor of eigenvalue higher than 1 (2.53). Variables included in the scale have loading values ranging from 0.60 to 0.80. The distinguished factor accounted for 50.6 percent of the total variance. The variables correlate with an aggregate result of the scale at the level ranging from r = 0.42 to r = 0.62 and thus Klein's criterion is satisfied. Cronbach's α ratio was 0.75 and, simultaneously, removing any variable would not cater to its increase. Detailed data are presented in Table 14.

Table 14. Matrix of non-rotated principal components and results of inner cohesion analysis for the scale defining students' declared level of crucial skills useful for operating a business (UM)

Variable	Factor loading value	Question – scale correlation	α following removal of question
UM_1	-0.679367	0.480044	0.717891
UM_2	-0.800808	0.617306	0.669330
UM_3	-0.785122	0.601304	0.671785
UM_4	-0.669089	0.475288	0.719483
UM_5	-0.604113	0.417229	0.744521
Eigenvalue			2.53188255688683
Participation in total variance accounted for			0.506376511377
Cronbach's α			0.749854

Source: Own elaboration.

For variables included in *'knowledge'* scale, the value of chi^2 statistic in Bartlett's Test was 209.4 (df = 10, p = 0.000), and KMO = 0.70 (threshold value), and what follows from the aforesaid, a factor analysis could be initiated. In the case of this scale, the analysis has also led to distinguishing only one factor of eigenvalue higher than 1 (2.28). Variables included in the scale have loading values ranging from 0.69 to 0.81. The distinguished factor accounted for 56.9 percent of the total

[4] Cf. A. Stanisz, *Przystępny kurs statystyki z zastosowaniem STATISTICA PL na przykładach z medycyny. Volume 3: Analizy wielowymiarowe*, StatSoft, Cracow 2007, pp. 265–266.

variance. The variables correlate with an aggregate result of the scale at the level ranging from r = 0.48 to r = 0.60 and thus Klein's criterion is satisfied. Cronbach's α ratio was 0.75 and, simultaneously, removing any variable would not cater to its increase. Detailed data is presented in Table 15.

Table 15. Matrix of non-rotated principal components and results of inner cohesion analysis for the scale defining students' declared level of knowledge connected with the first steps taken in a currently created company (W)

Variable	Factor loading value	Question – scale correlation	α following removal of question
W_1	-0.791147	0.576891	0.667717
W_2	-0.808484	0.601467	0.653248
W_3	-0.719554	0.506720	0.707436
W_4	-0.693310	0.479852	0.721074
Eigenvalue			2.277997
Participation in total variance accounted for			0.569499
Cronbach's α			0.746526

Source: Own elaboration.

Result analysis

Taking the adopted criteria into account, values for particular scales were estimated, and what follows, a comprehensive value (which reflects the scales of "skills" and "knowledge") was obtained. It is an average value for a set of questions (five and four) measuring the same attribute, which in this case is: the declared entrepreneurial skills and declared knowledge pertaining to early stages of operating a business.

Table 16 shows average results obtained for each of the attributes specified above.

The score presented in the first column from left is supposed to reflect students' average declared level of crucial skills useful for running a business. The data included in the table lead to conclusions that students rate this level at 3.41 on a 1 to 5 scale, which is a higher score than in the case of assessing the knowledge they should have taking the first steps in business (2.82). Over half a point difference, with t statistic value of 8.261 (p = 000) shows a statistically significant difference. In other words, one may say that students rate their skills better than their level of knowledge. What is interesting is that it holds true no matter what discipline is studied – business or non-business one.

Table 16. Average result of assessment of one's own skills and entrepreneurial knowledge – generally and according to discipline studied (business vs. non-business disciplines)

average *skills*	**average *knowledge***	**t**	**p**	**Standard deviation *skills***	**Standard deviation *knowledge***
total:					
3.405607	2.824766	8.261281	0.000000	0.632727	0.810882
for business disciplines (n = 33):					
3.321212	2.840909	2.620237	0.010962	0.744882	0.744296
for non-business disciplines (n = 181):					
3.420994	2.821823	7.855198	0.000000	0.611193	0.824339

Source: Own elaboration.

A cross-section analysis of the results against the criterion of gender reveals that there occurred no statistically significant differences between men and women – neither in skills, nor in knowledge level self-assessment. Data gathered in Table 17 further prove the above.

Table 17. Average result of assessment of one's own skills and entrepreneurial knowledge according to gender

	women	**men**	**t**	**p**	**standard deviation women**	**standard deviation men**
average *skills*	3.401471	3.412821	0.126003	0.899849	0.599504	0.690823
average *knowledge*	2.773897	2.913462	1.213131	0.226430	0.767921	0.878889

Source: Own elaboration.

Likewise, the results viewed according to studies cycle do not allow one to declare that students of Bachelor's degree studies perceive their knowledge or skills in a different way than those of Master's degree studies. It stems from the data in Table 18 that there are no statistically significant divergences between the two groups.

A comparison of declared skills in relation to particular faculties is presented in Table 19. As one may notice, students of Social Sciences, History and Management rate their skills highest, while students of Biotechnology and Mathematics rate them lowest.

Interesting conclusions may be drawn on the basis of a comparative analysis between faculties. Table 20 shows absolute score differences pertaining to skills self-assessment, with italics signifying the statistically significant differences (*at the level $\alpha > 0.95$; **at the level $\alpha > 0.99$; ***at the level $\alpha > 0.999$). One may notice that the most considerable differences have been reported between the

Faculties of Social Sciences and Biotechnology. The slightest differences, on the other hand, have been reported between the Faculties of Management and Law.

Table 18. Average result of assessment of one's own skills and entrepreneurial knowledge according to studies cycle

	First cycle studies	**Second cycle studies**	**t**	**p**	**standard deviation First cycle**	**standard deviation Second cycle**
average *skills*	3.409756	3.400000	0.111254	0.911520	0.637029	0.630344
average *knowledge*	2.857724	2.780220	0.690395	0.490701	0.845723	0.763613

Source: Own elaboration.

Table 19. Ranking of faculties according to the average result of assessment of the declared level of skills indispensable for running a business

Position	**Faculty of**	**Average Score**
1	Social Sciences	3.785714
2	History	3.714286
3	Management	3.564706
4	Law	3.550000
5	Biology	3.487500
6	Languages	3.440000
7	Chemistry	3.400000
8	Geography	3.323077
9	Economics	3.258824
10	Mathematics	3.222222
11	Biotechnology	2.991304

Source: Own elaboration.

The results of the analysis of the declared level of knowledge according to faculty, which are presented synthetically in Table 21, are slightly different. It stems from the data that the ones to rate their early stage business knowledge highest are the students of the Faculty of Law and Administration, while the representatives of the Faculties of Chemistry, Languages and Biology rate it lowest.

Table 20. Differences among faculties according to the average result of assessment of the declared level of skills indispensable for running a business

	Biology	Biotechnology	Chemistry	Economics	Languages	History	Mathematics	Geography	Law	Social Sciences
Biology										
Biotechnology	*-0.496**									
Chemistry	-0.087	*0.409**								
Economics	-0.229	0.268	-0.141							
Languages	-0.048	0.449	0.040	0.181						
History	0.227	*0.723***	0.314	*0.455**	0.274					
Mathematics	-0.265	0.231	-0.178	-0.037	-0.218	*-0.492**				
Geography	-0.164	*0.332**	-0.077	0.064	-0.117	*-0.391**	0.101			
Law	0.063	*0.559***	0.150	0.291	0.110	-0.164	0.328	0.227		
Social Sciences	*0.298**	*0.794****	*0.386**	*0.527***	0.346	*0.071***	0.563	*0.463***	0.236	
Management	0.077	*0.573**	0.165	0.306	0.125	-0.150	0.342	0.242	0.015	-0.221

Source: Own elaboration.

Table 21. Ranking of faculties according to the average result of assessment of the declared level of knowledge indispensable for running a business

Position	**Faculty of**	**Average Score**
1	Law	3.250000
2	Management	3.205882
3	Economics	3.161765
4	Social Sciences	3.089286
5	Geography	2.884615
6	History	2.690476
7	Biotechnology	2.641304
8	Mathematics	2.629630

Position	Faculty of	Average Score
9	Biology	2.609375
10	Languages	2.516667
11	Chemistry	2.513889

Source: Own elaboration.

Table 22. Differences among faculties concerning the average result of assessment of the declared level of knowledge indispensable for commencing a business

	Biology	Biotechnology	Chemistry	Economics	Languages	History	Mathematics	Geography	Law	Social Sciences
Biology										
Biotechnology	0.032									
Chemistry	-0.095	-0.127								
Economics	*0.552**	*0.520**	*0.648**							
Languages	-0.093	-0.125	0.003	*-0.645**						
History	0.081	0.049	0.177	-0.471	0.174					
Mathematics	0.020	-0.012	0.116	-0.532	0.113	-0.061				
Geography	0.275	0.243	0.371	-0.277	0.368	0.194	0.255			
Law	*0.641***	*0.609***	*0.736**	0.088	*0.733**	*0.560**	*0.620**	0.365		
Social Sciences	*0.480**	*0.448**	0.575	-0.072	0.573	0.399	0.460	0.205	-0.161	
Management	*0.597**	*0.565**	*0.692**	0.044	*0.689**	*0.515**	*0.576**	0.321	-0.044	0.117

Source: Own elaboration.

The analysis of inter-faculty differences clearly shows (Table 22) that the greatest differences occur between the Faculties of Law and Chemistry. The slightest differences, on the other hand, have been reported between Chemistry and Languages, as well as Mathematics and Biotechnology.

Recapitulation
(W. Bizon)

The studies conducted have proven that there occur statistically significant differences in terms of entrepreneurial skills among students of particular faculties, yet those with the greatest potential are not the students of economy-related disciplines. However, the test results have not indicated that gender influences entrepreneurial skills in a statistically significant way.

Analysing the answers of the surveyed students of the University of Gdańsk one may unequivocally say that they perceive an entrepreneur in a positive manner. An entrepreneur is considered a diligent, responsible and well-organised person. Moreover, the students themselves display entrepreneurial attitudes. They demonstrate the willingness to operate their own business activity, whose objective is not supposed to be only to generate profit, but also to gain them their own autonomy, as well as develop their interests.

It is worth emphasising that the students assess their business-relevant skills (such as courage, communication skills) higher than they assess their hard knowledge concerning e.g. business establishing procedures or methods of obtaining financing. Moreover, one may not state without a doubt, that the self-assessment of business disciplines representatives is distinctly higher, in terms of the said issues, than the self-assessment of others. However, low level of self-assessment is visible among mathematicians, and representatives of experimental sciences (Biotechnology, Chemistry).

Conclusions drawn from studies pertaining to competence perception, as well as the knowledge of students' expectations towards a future job, enterprise size, factors determining position's attractiveness (remuneration, distance from the place of residence, possibility of being promoted, opinion on employee etc.) may contribute to students' being better prepared to *take their first steps* in the labour market. Apart from the necessary measures to be taken by educational institutions, such as higher education facilities and secondary schools, it is also necessary to make the future generation of workers aware that being employed *by somebody* is just one of the possibilities. At present, it seems vital to entice the young to set up their own business activity and become self-employed.

Chapter 9

Methods of measuring the efficiency of education based on modern forms of knowledge transfer

Introduction

Research into the efficiency of transferring knowledge and skills are usually related to an attempt at assessing to what extent one form of education is more effective in reaching set objectives than other teaching methods. Various forms of work are generally applied in teaching on the academic level, from traditional lectures, through exercises and laboratories, case studies, to simulations and games. To supplement such tools, modern teaching means based on Information and Communications Technologies (ICT) are becoming more popular. As a result, what used to be unachievable for an average European university before the epoch of widespread IT, can be treated as an alternative to traditional forms of work with students all over the world in terms of accessibility and costs of use.

Two aspects are worth mentioning in this context: first, as regards in particular the area of business education, the tendency to 'make teaching more practical' is becoming apparent, i.e. solving problems that occur in reality that will be a student's life in several years, usually after graduation. A didactic tool that has been supporting teaching for a long time includes cases studies. Secondly, as the entry level of ICT skills held by students grows, the trend to use increasingly modern tools can be observed in classes. For example, simulations and business games embedded in the network and available remotely are in common use.

Regardless of teaching methods used by lecturers, their aim should be to fulfil didactic assumptions, i.e. to achieve a certain level of efficiency in knowledge transfer. However, the measurement of such efficiency remains a disputable issue. Two forms predominate: questionnaires administered to students about the usefulness and quality of classes and more objective measurements in the form of analysing knowledge and skill test results. However, the problem lies in the fact that traditional assessments of classes given by students afterwards do not always refer to the assessment of long-term teaching purposes. Other

aspects that condition their usefulness have to be mentioned, such as getting an easy credit in the subject measured with own work outlay, the personality of a teacher, and even a time of day when classes are held. Therefore, the element of education efficiency assessment remains highly personal and unreliable, because there are doubts if responses from trainees enable to measure accurately what the questions are designed to measure. In other words, their accuracy and reliability remain disputable.

Another aspect is an attempt at objectivizing measurements with regard to specific knowledge, concrete skills or specific attitudes to be acquired by trainees owing to classes. As far as the level of knowledge or its increment may be measured successfully and very objectively, in case of acquired or developed skills the final assessment of outcome may be related to certain subjectivism (e.g. through the introduction of arbiters). On the other hand, the assessment of achieved objectives with regard to presented attitudes (or their change) seems impossible to assess objectively at all. Moreover, the very process of organising measurements remains difficult in research terms. Research should be conducted continuously, with a relatively long temporal interval, and they require numerous (multi-element) samples that take account of necessary entrance aspects, important for the representativeness of studies[1].

Regardless of problems in obtaining clear assessments of how much the transfer of knowledge is effective, as results from the above-mentioned assumptions, they often have their source in the existence of institutional factors. For example, the assessment of teaching effects conducted in institutions (universities, schools) is carried out with a standard unified form. Therefore, it is difficult to measure the most important and concrete questions in the studied area of knowledge that would determine its nature and character.

If it is assumed, however, that universities deliver education in economic subjects or classes focused on developing entrepreneurial characteristics among students with the use of case studies, business simulations, and games available via ICT, i.e. such forms constitute an integral part of the teaching process, a question arises automatically how to measure their efficiency compared to other more traditional forms of knowledge transfer, such as lectures or classes. This part of the report has been dedicated to finding an answer to this question, by presenting examples of methods developed worldwide.

Theoretic background

If simulations and case studies constitute an integral part of courses in entrepreneurship, it remains to be resolved how to prove the development of knowl-

[1] W. Bizon, *Efektywność wspomagania zajęć dydaktycznych e-learningiem w akademickim kształceniu ekonomicznym*, "E-mentor" 2012, No. 1, p. 47.

edge and skills or the change of attitudes. Every attempt at finding an answer to such a question poses a challenge to researchers, because, as it has been mentioned above, it is very difficult to quantify objectively the benefits from studies through simulations and case studies. Anderson and Lawton have distinguished two main issues associated with the use of simulations, by asking the following questions[2]: (1): What do trainees learn from their involvement in a simulation? and (2): Is a simulation better than alternative pedagogic forms in achieving the set teaching objectives?

The problem of obtained benefits from the use of simulations has been raised before. Schumann, Anderson, Scott, and Lawton[3] indicated that there was apparent void in literature with regard to the impact of teaching with simulation on results, both from the perspective of students and employers. They also pointed out that the main cause of the situation was the lack of the properly selected assessment instruments. In other words, it is not known how to measure the efficiency of teaching based on business simulations, because no proper measuring tools have been developed that would be generally accepted. Moreover, attention was drawn to the fact that if business simulations are designed as tools that reflect the real environment better, it can be presumed that their use will result in positive changes observed in the area of behaviour (attitude) of students.

In the light of existing practical solutions used to improve the measurements of efficiency for the new forms of knowledge transfer, the most useful and frequently applied methods of evaluating the transfer of knowledge, not only with regard to business simulations but also to general curricula, include the model dating back to the 1950s-60s created by Donald Kirkpatrick. According to his formula, the assessment of teaching process effects should comprise partial scores obtained in the following four isolated levels:

- reaction,
- learning,
- behaviour, and
- results.

Table 23 presents a short characteristic of each of the isolated levels together with attributed auxiliary questions.

[2] P.H. Anderson, L. Lawton, *Is Simulation Performance Related to Application: An Exploratory Study*, "Developments in Business Simulation and Experiential Learning" 2002, Vol. 29, p. 108.

[3] P.L. Schumann, P.H. Anderson, T.W. Scott, L. Lawton, *A Framework for Evaluating Simulations as Educational Tools*, "Developments in Business Simulation and Experiential Learning" 2001, Vol. 28, pp. 217–219.

Study – assumptions and partial objectives

The efficiency of teaching in a broad sense can be determined by benefits obtained in three areas: knowledge, skills, and attitudes, and its measure defines to what degree the set teaching objectives have been achieved[4]. Therefore, the research process focuses mostly on analysing the final results of knowledge or skill tests and on measuring the satisfaction among trainees. Studying the efficiency of various forms of knowledge transfer involves in general determining the differences between a study group and a control group at the beginning of a course (pre-tests) and after classes (post-tests)[5].

Table 23. Characteristics of teaching effect assessment levels and typical auxiliary questions

Level	Characteristics	Auxiliary question
reaction	Collecting opinions and assessments about the satisfaction level among trainees, the technical aspects, and the competences of trainers	Did trainees enjoy the course? What are they going to do with the knowledge acquired in the training? Did a trainee experience any positive emotions during the course?
learning	Checking the level of acquired knowledge and/or skills with tests; analysing and assessing the level at which the set teaching objectives have been achieved	Has the growth of knowledge and skills been observed? What has a trainee learnt? Has the attitude of a trainee changed? How?
behaviour	Determining the impact of training (education) on the change of behaviour and/or attitude	To what extent has the efficiency of work and specific actions improved? Does a trainee have an opportunity to use the acquired knowledge and skills at work? Does the change of behaviour result from the training?
results	Identifying benefits obtained by trainees that affect the achievement of objectives set by the organization as a whole	Do trainees use the effects of the training in their work? Do the changes of behaviour have a positive and measurable impact on the results of the institution? What is the return on investment in education? Has the organization come closer to the achievement of its objectives?

Source: Own study based on: M. Dąbrowski, *Analiza pomiaru efektywności kosztowej procesów e-learningowych*, "E-mentor" 2008, No. 5, p. 20.

[4] See: L. Chien-Hung, Ch. Tzu-Chiang, H. Yueh-Min, *Assessment of Effectiveness of Web-based Training on Demand*, "Interactive Learning Environments" 2007, Vol. 15, No. 3, p. 221.

[5] T.D. Cook, D.T. Campbell, *Quasi-Experimentation. Design and Analysis Issues for Field Settings*, MA: Houghton Mifflin Company, Boston 1979.

The explainable changes in the cognitive structure of trainees are measured with tests of knowledge (sometimes of skills). Hence, the results of pre- and post-tests are compared for both groups. The comparison of post-test results makes it possible to find differences between groups that could occur as a result of different impacts (the transfer of knowledge) on trainees during classes. However, in order to analyse the obtained results fully, it is necessary to conduct earlier pre-tests in order to exclude a situation where differences observed owing to post-tests were present already before the start of education. Pre-tests should be always applied when one cannot state that the selection of group members (study and control groups) was random. In other words, the process of measurement performance comes down to the isolation of two stages (preliminary and principal one) and conducting the necessary analyses within each of them. This question can be defined in working terms as follows:

– a preliminary stage: ascertaining if the groups selected for tests (study and control groups) are different in terms of initial conditions that would have impact on the effect of education, and
– a principal stage: the proper study, i.e. comparing the effects of training in the study and control groups.

Each stage involves relevant measurements. The transfer to the second stage is possible only if the premises are fulfilled that there are no initial differences between the tested groups that could affect the final outcome of knowledge transfer.

The objective of the initial (first) stage is to prove that the compared groups do not differ in terms of initial factors that determine the efficiency of education. Such factors may include: age, sex, education, motivation, and general intelligence of subjects. If members of both groups belong to the same environment, which is the case e.g. in the academic context, the study accent may be shifted from the analysis of characteristics such as age or education to other parameters, e.g. motivation, interest in the study area or the initial level of knowledge[6].

The initial stage comprises a number of consecutive and chronologically arranged tests. The simplest question is to prepare and carry out tests of initial knowledge of the tested discipline and determine potential differences (the test of average values for the group and the tests of importance). If the selection for the study and control groups were not random, the next issue should be to analyse internal factors that may condition the occurrence of initial differences between the groups (motivation and declared interest in the area of knowledge). Because it is hard to objectivise the measurement with a single question asked in a questionnaire for such complex cognitive categories as motivation or interests, relevant scales are to be created or a questionnaire is to be prepared consisting of about a dozen questions that are related to the tested target concept (e.g. motivation or interest). As a consequence, the next step should be to test

[6] See: W. Bizon, *Trafność i rzetelność pomiarów wstępnych przy badaniu efektywności szkoleń e-learningowych*, "E-mentor" 2010, No. 5, p. 24.

the theoretic accuracy of the adopted scale with the Bartlett's test (to justify the subsequently used analysis of factors, i.e. to prove that the matrix of variable correlations is not a unit matrix) as well as the factor analysis, in order to eliminate any redundant questions. In this case, the points of reference applied in practice, i.e. Kaiser's criterion, are to be followed in general (the characteristic values of isolated factors are to be higher than one). Moreover, it should be ensured that the variables that form the individual scales correlate at least at 0.6 with the first main component that forms the scale (the minimum value of factor loadings at 0.6). Next the Kaiser-Mayer-Olkin rate is calculated[7] (KMO), in order to check the adequacy of the correlation (the threshold value at minimum 0.6). The next stage is to determine the reliability of the used scale with the Klein's criterion[8] (individual variables should correlate with the summary result for the scale at minimum 0.4) and the Nunnally's criterion[9] (in the tested scales the Cronbach's alfa coefficient should exceed 0.7). As a result, the level of potential differences in the declarative variables can be determined finally (the test of average for a group, significance tests) and, if they do not occur, a decision can be taken to move on to the second stage, i.e. the principal measurement.

On the other hand, the objective of the second (principal) stage is to compare the results obtained by trainees depending on the form of classes. In order to provide the objectivity of measurements, the training is to be provided in the study and control groups in such a way that the content scope of classes is the same and provided in the same timeframe. On the other hand, the final tests (concerning knowledge and skills) should be exactly the same for all trainees, regardless of the way they were taught. Finally, the test of declared perceived satisfaction with classes should be based on an accurate and reliable measuring scale made of several (up to a dozen) questions.

The principal stage commences with the phase of preparation and conducting the final tests of knowledge and skills as well as determining the potential differences with regard to variables whose measurement can be easily objectivised. For declarative variables, it is necessary to prepare and develop completed questionnaires, preceded with the tests of theoretic accuracy and reliability of the adopted scale. As a result, it will be possible to determine the potential differences in the scope of declarative variables and formulate the final conclusions concerning the measurements of teaching effects in both groups.

Another approach to determining the efficiency of a knowledge transfer form is to determine the increments of 'gains' obtained in the result area owing to teaching. It concerns the increased knowledge resources, developed skills, and creating or reinforcing desired attitudes. The measurement in this case comes down to the accurate test of progress and an attempt at answering the following

[7] G. Wieczorkowska, J. Wierzbiński, *Statystyka. Analiza badań społecznych*, Wydawnictwo Naukowe Scholar, Warszawa 2007, p. 322.

[8] P. Kline, *A Handbook of Test Construction. Introduction to psychometric design*, Methuen, London 1986, p. 14.

[9] J.C. Nunnally, *Psychometric Theory*, McGraw-Hill Book Company, New York 1976, p. 245.

question: 'How much more/better is it at the end than at the beginning?' In this case, to simplify interpretation, the same tests are applied at the beginning and end of study. To eliminate the effects related to remembering, questions may be asked in a different sequence or with slightly changed wording. It is noteworthy that the use of specific case studies or business simulations in teaching may give concern that some of the questions will refer directly to aspects that have been stressed or exercised and, therefore, it is not possible to use them in questionnaires prepared at the pre-test stage. In this case, one can consider the test of correlation level between pre- and post-tests.

An advantage of business simulations is the ability to use the same tool a number of times during one course, and each time it is possible to modify the entry parameters by a user, which enables to experience a completely different market situation 'at the output'. This working mode naturally results in the occurrence of a multitude of scenarios and contributes to the necessity to interpret a larger number of phenomena, which enhances the efficiency of the teaching process.

However, regardless of the form of knowledge transfer, the question of transferring secret knowledge or doubts about estimating the level of so-called carry-over effect remain, which in this context may mean that the skills practised with specific tools (e.g. simulations, case studies) may be observed clearly only at a later date and only in a context that is similar to the original one. Countermeasures that enable to limit the above-mentioned imperfections include the repeated use of a simulation (or a case study) as a tool that tests the level of acquired knowledge, the development of skills or a change of attitudes. In other words, by assessing results in a second approach and referring them to the initial results, one can test the dynamics of knowledge (skill) growth for each round. However, one should be aware that the methodological problems associated with the application of a simulator (or a case study) as a test of achievements obtained with the same simulator (or case study) remain debatable in literature and the legitimacy of measurements based on such a structure has not been proven explicitly[10]. Therefore, the greatest problem for researchers remains the question of the suitability and reliability of tools applied to measure the achievements of students, and the 30-year-old statement that '(…) it is difficult to determine now if the lack of evidence supporting the claims results from poor results or the improper method of measurements'[11] remains still valid.

[10] See: J. Funke, *Microworlds Based on Linear Equation Systems: A New Approach to Complex Problem Solving and Experimental Results*, [in:] *The Cognitive Psychology of Knowledge*, G. Strube, K.F. Wender (eds.), Elsevier Science, Amsterdam 1993.

[11] C.S. Greenblat, *Teaching with Simulation Games: a Review of Claims and Evidence*, [in:] *Principles and Practices of Gaming-Simulation*, C. Stein Greenblat, R.D. Duke (eds.), Sage: Beverly Hills/London 1981, p. 152.

Effects of comprehensive studies – an example

One of the most important elements in teaching business subjects is to stress the development of knowledge and characteristics that are usually attributed to managers. Studies conducted among graduates of business schools with a work experience from three to five years at the end of the 20th century[12] have shown how individual management competences are perceived by practitioners due to their actual usefulness at work. Out of the 41 proposed executive competences, respondents considered the following skills / abilities to be the most important ones:

- adapting to new tasks,
- taking decisions,
- organising,
- a quick assessment of situation,
- collecting proper information,
- perceiving phenomena in a comprehensive manner,
- problem analysis,
- prioritising tasks,
- analysing data,
- time management,
- writing clearly,
- creative thinking,
- active listening,
- planning, and
- setting targets.

Moreover, as it has been mentioned above, various forms of knowledge transfer are used in business education. In particular, such forms include: traditional lectures, activating classes with a role play, business simulations, and case studies. The above-mentioned studies have proven conclusively that according to managers, the most effective form of teaching are computer business simulations, which were ranked higher than activating exercises, followed by case studies and traditional lectures[13]. Moreover, it has been shown that each technique of knowledge transfer enables to develop individual competences in a different manner. Lectures were most effective in developing the ability to listen actively and case studies in teaching how to analyse a problem, data or collect suitable information and write clearly. Case studies were perceived as the most effective way of extending knowledge and developing skills in 8 out of 41 studied characteristics. Activating exercises were found to be most effective in developing 12 competences (including creating a problem solution and public

[12] D.T. Teach, G. Govahi, *The Role of Classroom Techniques in Teaching Management Skills*, "Simulation & Gaming" 1993, Vol. 24, pp. 429–455.

[13] See: J.N. Trapp, S.A. Koontz, D.S. Peel, C.E. Ward, *Evaluating The Effectiveness Of Role Playing Simulation And Other Methods In Teaching Managerial Skills*, "Developments In Business Simulation & Experiential Exercises" 1995, Vol. 22, p. 116.

speaking). On the other hand, simulations were considered to be most useful in teaching how to take decisions, anticipate, assess a situation quickly and adapt to new tasks. In total, almost half (20 out of 41) management competences, according to practitioners, were developed most effectively with business simulations used in educational processes.

Why are simulations so effective?

According to practitioners, the response to the question why simulations are effective is very simple and results from 10 elements[14]:

1. a high level of realism,
2. dynamic competition by taking interrelated decisions,
3. illustrating clearly dependencies and focusing on new ways of thinking,
4. supporting discussions on the most important problems, both in a team and among individuals,
5. direct references to business that enable to use specific skills in a business practice,
6. high quality and versatility of a tool that enables to add extra elements (chat, forums, group discussions, etc.), including less formal ones,
7. user-oriented,
8. adapted to a specific target group,
9. result-focused, and
10. the ability to develop contacts and support teamwork.

[14] R. Adl, *Simulations: Why Are They Effective?*, "Human Capital Insights" 2010, October, p. 3.

Chapter 10

An analysis of the level of knowledge about entrepreneurship and business practice among students participating in the *Case Simulator* project

Introduction

The idea of the *Case Simulator*[1] project was to involve representative university student groups in classes devoted to analyses of specially designed case studies on running a business activity and in using a simple online business processes simulation, which was based on originally developed premises. Participants in the project were recruited in such a way that all eleven faculties within the University of Gdańsk were represented, thereby reflecting a broad range of disciplines studied (from humanities through to social sciences, life sciences, science and business). Secondly, in-group diversity was ensured, with excelling students working hand in hand with those whose achievements were poorer.

Project participants' results can be verified in two ways. Firstly, the level of skills and knowledge in students who participated in classes can be matched against the achievements of a group of University of Gdańsk students who did not attend the course ('external contestants'). Secondly, one can compare a change (enhancement) in skills and knowledge resulting from students' participation in classes based on the case studies and business simulation.

The next section of the present chapter is an attempt at verifying the knowledge and skills acquired by the project participants, based on both the approaches mentioned and referring to indispensable methodological tenets and interpretation concerns.

[1] The *Case Simulator* project was part-financed by the European Social Fund within the Framework of the Human Capital Operational Programme. Coordinating partners: The Faculty of Economics, University of Gdańsk (leader), Regional Pomeranian Chamber of Commerce (national partner – employers association), Hochschule für Technik und Wirtschaft Dresden (transnational partner). Time framework: 01/09/2011 – 15/12/2013. Implementing Institution: Voivodeship Labour Office in Gdansk. Subsidy Contract No.: POKL.06.01.01-22-166/10-01.

Characterisation of the knowledge area under study

In the light of the aims of the *Case Simulator* project, it is the notion of entrepreneurship in its practical dimension that is the most important knowledge acquisition related phenomenon under study. In this sense, entrepreneurship is reflected in issues immanent in running one's own business, especially in early stages of its development. A set of test questions related to this thematic block was compiled, covering topics such as:

- sales promotion,
- SWOT analysis,
- the essence of income statement,
- issuing vs. not issuing invoices (documenting transactions),
- formulating goals for the company,
- segmenting and isolating target groups of purchasers,
- models of potential customer reactions,
- product launching strategies,
- ways of raising capital for financing enterprises,
- profit and profitability of invested resources.

Methodology

The study has been divided into two parts (stages). First of them concerns relating project participants' achievements to those of students who did not attend the classes. Part two involves measuring the enhancement in knowledge and skills in connection with students' participation in classes built around case studies and business simulation.

State of knowledge among project participants against the background of those who did not participate in *Case Simulator*

The study covered a group of participants in the entrepreneurship competition following the course. Among them were both the participants in the *case studies* and business simulation based classes and individuals who did not attend the classes. It has to be stipulated here that, while the selection of course groups allowed students with different level of knowledge and skills to attend the classes (preliminary qualification tools were applied to select both excelling and weaker

students), one can expect that the individuals who took part in the competition only must belong to people who believe they have every chance to succeed. This leads to the assumption that they must have been excelling students in terms of knowledge and skills.

As the competition results revealed a major discrepancy, both among the project participants and the external contestants, between the students of the so-called business faculties (economy related disciplines) and those of non-business ones, it appears fully justified to present the results pertaining to these groups separately. Table 24 shows a comparison of final tests results scored at business- and non-business faculties.

Table 24. Final tests results (percentage of right answers) at business- and non-business faculties – *Case Simulator* participants (99 persons) vs. external contestants (65 persons)

	participants in *Case Simulator* classes				**final competition participants other than *Case Simulator* ones**			
	business faculties average (n = 25)	**non-business faculties average (n = 74)**	**t**	**p**	**business faculties average (n = 29)**	**non-business faculties average (n = 36)**	**t**	**p**
knowledge assessment – final test ENTREPRENEURSHIP	78.77	60.81	4.124	0.000	61.54	44.87	3.883	0.000

Source: Own elaboration.

Later in the chapter, a comparison is made of the knowledge of entrepreneurship among project class participants and the students who did not participate in the classes but took part in the final competition. The observations made and described above led to conducting separate analyses pertaining to students representing business- and non-business disciplines respectively.

Knowledge transfer efficiency assessed on the basis of test performance analysis in business faculties' students

Within the subgroup of business faculties' students (the Faculty of Economics and the Faculty of Management), test results were compared in participants in *Case Simulator* classes (group I, 25 persons) and in 29 control group students (group II). It is worth emphasising again that, whilst the *Case Simulator* partici-

pants were representative of the population of students at a particular faculty, the external contestants (control group) were probably outstanding students only. Table 25 juxtaposes final test results of group I with those of group II.

Table 25. Performance of business faculties' students (percentage of right answers) at knowledge test – scores for project class participants (group I, 25 persons) and external student contestants (group II, 29 persons)

	average group I	**average group II**	**t**	**p**	**SD group I**	**SD group II**
knowledge test ENTREPRENEURSHIP	78.77	61.54	4.730	0.000	13.56	13.16

Source: Own elaboration.

The level of knowledge related to practical aspects of entrepreneurship is the most significant index of the efficiency of project activities, quality of the developed products and their convergence with the *Case Simulator* goals defined at the outset. Analysing the data presented in Table 25 one may notice that, on average, the results scored by the project participants reflect a 79% accuracy of their answers. Compared to the control group scores (61.5%), this translates into a difference of over 17 percentage points (which constitutes a relative difference of 21.9%). The *t* statistics values show that, with the significance level assumed (α = 95%), the differences obtained are statistically significant (t = 4.73; p = 0.00). It proves the efficiency of the adopted teaching method in regard to the scope of entrepreneurial knowledge. These figures argue for a thesis that the *Case Simulator* project substantially contributed to business faculties' students' making up for their knowledge deficiencies regarding practical aspects of running a business.

Figure 28 shows the scores for business faculties and relative differences in the scores.

Knowledge transfer efficiency assessed on the basis of test performance analysis in non-business faculties' students

The group of students representing non-business faculties (group I – participants in Case Simulator classes) consisted of 74 persons. Their performance was compared with scores in the group of project independent contestants (group II – 36 persons). The analysis was performed in the same manner as the one pertaining to business faculties' students. The results have been presented in Table 26.

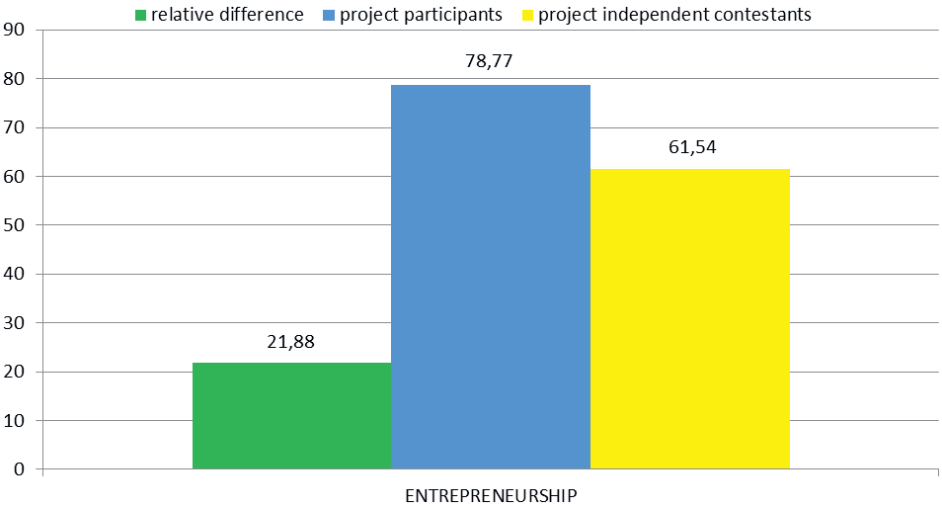

Figure 28. Level of students' knowledge (business faculties) in *Case Simulator* class participants and project independent contestants

Source: Own elaboration.

Table 26. Performance of non-business faculties' students (percentage of right answers) at knowledge test – scores for project class participants (group I, 74 persons) and external student contestants (group II, 36 persons)

	average group I	**average group II**	**t**	**p**	**SD group I**	**SD group II**
knowledge test ENTREPRENEURSHIP	60.81	44.87	3.897	0.000	20.26	19.85

Source: Own elaboration.

As regards the level of knowledge about practical aspects of entrepreneurship, the reported average results scored by the project participants neared 61% of correct answers in the test paper, with 45% in the control group. This means a difference of almost 16 percentage points, and the relative difference of 26.2%. The *t* statistic values prove the differences obtained to be statistically significant ($t = 3.88$; $p = 0.00$), which means that the teaching method applied is efficient, and supports a claim that the *Case Simulator* project substantially contributed to non-business faculties' students' making up for their deficiencies regarding practical aspects of running a business.

Figure 29 shows the results of both student subgroups within non-business faculties and relative differences in the scores pertaining to the knowledge area under study.

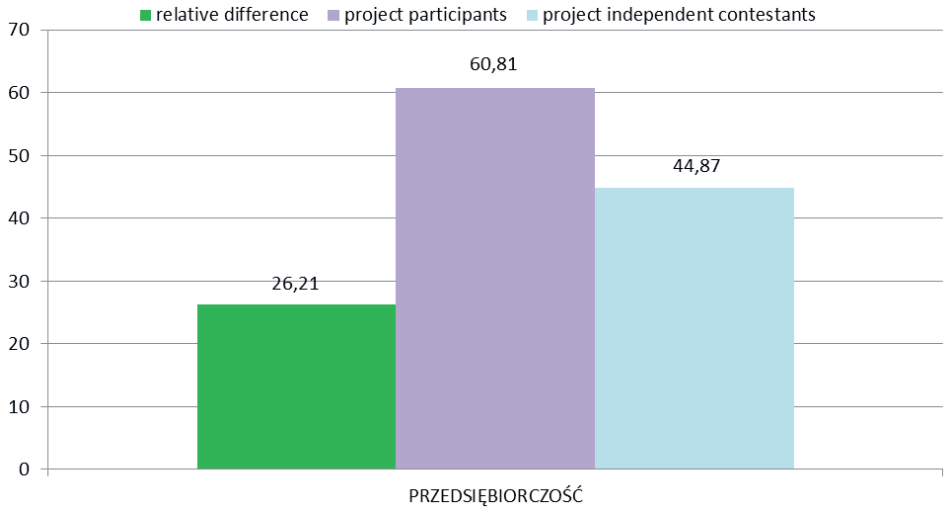

Figure 29. Level of students' knowledge (non-business faculties) in *Case Simulator* class participants and project independent contestants

Source: Own elaboration.

Stage one – conclusions

In order to define the level of entrepreneurial knowledge in students, it is advisable to start from excluding students of faculties (disciplines) of economics from the analyses. This approach follows from a preliminary diagnosis, which indicated that due to the fact that many economy-related subjects are covered at the faculties mentioned, a very clear difference was reported in relation to this domain between the contestants who studied business and those who did not. This observation is in line with the contents of the project subsidy contract, which emphasised that the target group of the project was to comprise also those who have not benefited from the support before (last grade university students of non-business disciplines.)

These conclusions appear to confirm what was the driving force behind the implementation of the *Case Simulator* project, i.e. a fact that there is an obvious gap in training and formal education in practical perception of entrepreneurship at lower levels of education. On the other hand, orienting activities towards an alternative and innovative form of knowledge transfer and a proper selection of learning material – making it likely to match future graduates' real demands – constitutes an effective tool for enhancing knowledge and practical skills of running a business.

To recapitulate, it is worth indicating what is probably the most important conclusion. Namely, as regards the knowledge area that is critical for the goals defined within the *Case Simulator*, i.e. practical aspects of business and entrepre-

neurship, in both the business and non-business student groups there is a very clear difference between those who applied the case study analyses and the business simulation and those who did not participate in the classes. Set against the indices adopted *a priori*[2] this observation leads to a conclusion that the absolute difference of 26.2% reported at non-business faculties proves the application of the *Case Simulator* toolbox of activities a success, even with a 21.9% difference at business faculties. It appears sensible, as suggested before, to expect less significant differences in students of business faculties due to both a higher absolute index value and the nature of the teaching profile focus discussed. Undoubtedly, in this context, the results obtained can be considered a success of the project measures.

Entrepreneurial knowledge enhancement in the *Case Simulator* project participants

In order to measure the students' results, knowledge assessment tests were conducted among the participants before the classes started and on their completion. The data presented below concern a group of 99 male and female students who participated in the project and in the final entrepreneurship test, which verified the level of their knowledge at the finishing line of the course.

Due to logistic issues not all the project participants took part in the final competition or the final survey. Therefore, it had to be decided whether the sample of 99 persons (out of 170 class participants) could be used in further comparisons. One of the ways to do it was to establish whether the initial level of knowledge (before the project started) about the areas under study had been similar among those who sit final assessment and those who, despite their participation in the course, did not. A comparison of the preliminary test results for 170 persons is shown in Table 27.

It can be noticed that the differences in the average preliminary test scores in both groups are so insignificant that there are no grounds to claim that the group of students who did not participate in the competition differs greatly from the ones who took part in both the competition and final tests. Thus further stages of analyses and conclusions they lead to can rely on the 99-person sample as sufficient.

The following part of the article is a presentation of results pertaining to the knowledge enhancement apportioned according to course participants' sex and faculty.

[2] It was assumed in the *Strategy for innovative project implementation* that the results obtained at the entrepreneurship competition by project beneficiaries participating in the testing of the latter (participants in classes based on case study analyses and business simulation) would be on average 25% better than those in the group that did not take part in the project.

Table 27. Course participants' preliminary test results (percentage of right answers) – students who did not participate in the competition (group I, 71 persons) vs. group of competition participants (group II, 99 persons)

	average group I	average group II	t	p	standard deviation group I	standard deviation group II
preliminary knowledge test ENTREPRENEURSHIP	39.11	42.27	-1.100	0.273	18.61	18.33

Source: Own elaboration.

Table 28 shows the scores from the preliminary test and from the final one. We can see that the average project participants' results improved from 42% of correct answers to over 65%, which equals a change by 54.9% (over 23 percentage points). According to the statistics, with the significance level assumed (α = 95%), these differences are statistically significant (t = -8.42; p = 0.00), which proves the teaching method under study to be effective.

An analysis of the test results against the criterion of the participants' sex reveals that it was men who scored clearly better results at the preliminary test (48.02% on average compared to 38.71% in women), which indicated a statistically significant difference (t = 2.51; p = 0.01). The statistically insignificant sustained men's advantage at the final test (68.61% against 63.40%, t = 1.24; p = 0.22) proves that the didactic process bridged the gap quite successfully.

Table 28. Preliminary and final test results (percentage of correct answers) among project participants

	average group I	average group II	t	p	standard dev. group I	standard dev. group II
preliminary knowledge test ENTREPRENEURSHIP total (n = 99)	42.19	65.35	-8.422	0.000	18.33	20.30
preliminary knowledge test ENTREPRENEURSHIP women (n = 62)	38.71	63.40	-7.211	0.000	15.63	21.97
preliminary knowledge test ENTREPRENEURSHIP men (n = 37)	48.02	68.61	-4.626	0.000	21.10	16.95

Source: Own elaboration.

Figure 30 shows a percentage distribution of the points scored at the tests. As one can notice, the proportions of persons scoring the lowest results (from 0 to 20%, from 20% to 40% and from 40% to 60%) decreased from 5.05% to 3.03%, from 54.55% to 12.12% and from 20.20% to 16.16% respectively. At the same time, the proportions of persons who scored top results visibly increased. While the results between 60% and 80% and over 80% were scored by, respectively, 15.15% and 5.05%, the numbers soared to 43.43% and 25.25% of the participants in the final test. These changes are yet another argument for the efficiency of the didactic methods applied with respect to the transfer of practical entrepreneurship.

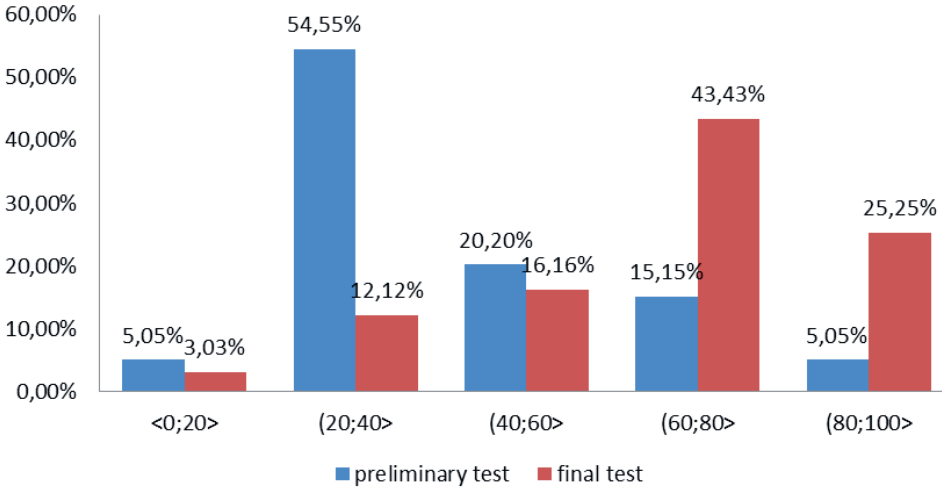

Figure 30. Distribution of the proportion of correct answers at the preliminary and the final test

Source: Own elaboration.

Analysing the results according to faculties, the Faculty of Economics ranked first as regards best performance at the preliminary test (an average of 64.8%), with the Faculty of Biology occupying the last position (29.6%). At the final test, the Faculty of History turned the leader (85.9%, an increase of 47.4 percentage point!), and the Faculty of Chemistry scored lowest (49.1%, a rise of 16.6 percentage point).

Comparing the students' scores with regard to their studies one can see that, both at the preliminary and at the final tests, the students of economy- and business related disciplines achieved the best results in terms of points scored (63.1% at the preliminary test and 78.9% at the final one). The scores for the students of disciplines from the realm of humanities (the Faculty of History and the Faculty of Languages) were 34.1% at the preliminary test and 69.2% at the final one. As regards the typically life sciences oriented faculties (the Faculty of Biology and the Faculty of Biotechnology), the scores were as follows: 32.1% at the pre-

liminary test and 63.8% at the final assessment. To recapitulate the part of the present study pertaining to the analysis of the practical entrepreneurial knowledge test results in relation to particular faculties and disciplines, it is students of business faculties who rank highest. However, owing to the participation in the classes, there has been very significant entrepreneurial knowledge enhancement among the students of humanities and life sciences.

Stage two – conclusions

A synthetic result analysis leads to a conclusion that significant knowledge enhancement has been reported, which is due to the students' participation in specially designed classes based on the case study method and a complimentary business simulation. The application of these methods proves that indeed the *Case Simulator* project focuses on enhancing practical aspects of entrepreneurship (rather than on teaching nothing but theories on the economy), which was confirmed also in other studies.

It should be emphasised that the most crucial conclusion of the analyses presented in this subchapter is the one that, in the knowledge area related to the objectives of the *Case Simulator* project, i.e. practical aspects of entrepreneurship, it is the dynamics of change that was the greatest. The reported level of growth neared 55%, which is almost 5 points more that the level originally planned before the launch of the project. Additionally, the knowledge enhancement ratio reported in the female group – a potentially disadvantaged group in terms of the general perception of its members' business knowledge – was almost 64%. Figure 31 depicts details of the dynamics.

Final remarks

Having considered the *Case Simulator* effectiveness indices defined in the *Strategy for innovative project implementation*, the classes based on the package of the online business simulation and the set of cases studies constitute an effective tool for the enhancement of practical knowledge, which is indispensible for establishing and running a business activity.

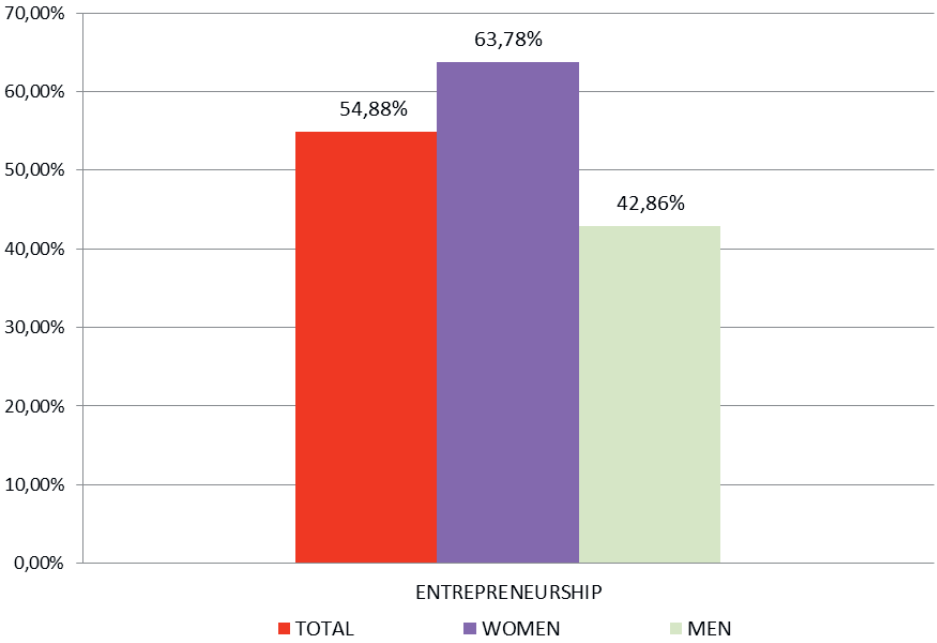

Figure 31. Dynamics of change in knowledge among *Case Simulator* participants according to their sex

Source: Own elaboration.

Conclusions

The primary goal of the present publication was to discuss the results of studies on the effectiveness of applying simulations and case studies in the process of teaching entrepreneurship. Achieving this goal involved engaging employees of the Faculty of Economics of the University of Gdansk in the Case Simulator project.

The project, implemented by an international team – in collaboration with German scholars from Hochschule fur Technik und Wirtschaft Dresden among others – resulted in a number of valuable observations.

The two-year period of developing solutions and ways of testing them led to formulating a few conclusions. The most vital one is that the transfer of theoretical and practical knowledge by means of both tools tested is characterised by significant effectiveness, which translates onto efficient teaching of entrepreneurship. Additionally, it was observed that, regardless of the initial level of knowledge and skills, it is possible to produce statistically significant positive changes. Another important conclusion is that the tools which were put to the test proved to be more effective with the group considered disadvantaged on the labour market, i.e. women.

The tools developed within the project are not complete or finished products. They need to evolve and adjust to changes in the environment as well as to users' and recipients' expectations. In order to be able to promptly respond to changing market conditions further work will be required, which, should the need arise, will modify both the scope and the form of the simulation and case studies. It is also possible to use the products developed as a basis for the creation of other solutions tailored to particular educational profiles, for example.

It is important to disseminate the tools developed in the course of the project also beyond the academia so as to reach broader audiences such as professional advisors, business support institutions and even entrepreneurship teachers in secondary schools. The project results are to be incorporated into the didactic stream at the University of Gdansk on a few levels in parallel. Case Simulator based classes have been scheduled for the Faculty of Economics as well as in a few departments within the Faculty of Humanities and the Faculty of Social Studies. At the same time, subjects to be taught by means of business simulations and case studies as well as those directly based on the Case Simulator project have been envisaged as part of the postgraduate studies in Entrepreneurship and Economic Education. There has also been a very positive

feedback from other universities and institutions cooperating with the academic world. Declarations were made about the willingness to introduce the tools developed by the Faculty of Economics of the University of Gdansk in both domestic and international centres, the latter proving a universal character and high quality of these solutions.

The present compilation seeks to draw the reader's attention only to the most crucial aspects of the theory and practice of applying innovative methods in teaching entrepreneurship. Undoubtedly, the future has new, even more efficient tools in store. What is considered innovative today will soon join the ranks of the obsolete inkpot or traditional blackboard and chalk, which are being slowly superseded. By the same token, what is important today in terms of mindset and desirable skills: assertiveness, self-presentation ability, interpersonal skills and teamwork may eventually be superseded by something quite different and unknown so far but connected, for example, with the growing significance of network or virtual reality among young people. Having said that, however, it appears likely that entrepreneurship will remain a vital driving force behind the development of particular countries. If this be the case, successful attempts to stimulate it will play a crucial role.

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