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Work from the university into the society of Europe Europe can only win the future through interdisciplinary cooperation in education

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Abstract

In a speech at the Sorbonne on September 26, 2017, French President Emmanuel Macron called for the formation of a network of universities from several European countries. (Compare: Macron 2017) In order to strengthen the connection to other universities and to the international economy in Cluj Napoca, the Faculty of Economics and Management at Babes Bolyai University has been holding a conference in February for six years entitled "Fit for the future through discussions between the university and the business community". Students and professors organise an interdisciplinary collaboration with European universities through video conferences, workshops and student conferences under the motto "Find ideas and inspiration together through lateral thinking" with the core topics of sustainability and digitalisation. In the conferences, students from the Ruhr West University of Applied Sciences - Bottrop Campus and the Babes Bolyai University develop additional proposals, change considerations and innovative solutions for their bachelor or student theses. For example, students of economics learn from their fellow students of digital technology, among other things, the different methodological approaches in the specialist sciences. These findings can be used in the development of bachelor's, master's or student theses.

Keywords: interdisciplinary research, university cooperation, sustainability, digitisation.

Main Conference Topic: Erasmus and Exchange experiences in Universities.

Introduction

The challenges of today are primarily digitisation and sustainability. (See: Sterling, 2006) The "sustainable university" is a university that seeks to explore and demonstrate the challenges arising from the growing global discourse on sustainability through ethics, leadership and curriculum. (See: Hasselkuß, 2018) (See: Frankfurter Allgemeine Zeitung, 2018)

That is why the scientists at many research institutes work together with researchers from different disciplines. Complex social problems and technical challenges can only be solved through interdisciplinary cooperation. We need people who can work in depth in their field. In addition, they also have to deal intensively with interdisciplinary research. (Compare: Junghans - Knoll 2018) The main task is to expand communication between the disciplines. Innovation then arises at the interfaces between the sciences (e.g. engineering, economics and IT sciences).

That is why the business faculty of Babes Bolyai University and the University of Applied Sciences Ruhr - West - Campus Bottrop - are organising an interdisciplinary collaboration through video conferences, workshops and student conferences under the motto "Finding ideas and inspiration together through lateral thinking" with the key issues of sustainability and digitisation.

Time is running out. On the subject of sustainability, society worldwide needs short-term approaches for solutions in a wide variety of disciplines. Christopher Schrader (Süddeutsche Zeitung) particularly clearly describes the almost hopeless situation in a newspaper article - "Is the ice age coming?":

The tipping point of the climate system, such as the deforestation of the Amazon rainforest or the melting of Greenland's ice sheet, could soon be reached. The climate system could irreversibly change to another state and threaten the living conditions of humanity. Deforestation in the forest and global warming are also globally linked. If there is a chain reaction, temperatures on Earth could ultimately rise by five degrees Celsius, no matter how hard the international community resists. "If one of the elements is tipped, it pushes the earth towards another tipping point," says Johan Rockström, climate researcher and head of the Stockholm Resilience Center. Stopping the negative trend could be very difficult or impossible.

Hans Joachim Schellnhuber, Director of the Potsdam Institute for Climate Impact Research, adds: "We are showing how greenhouse gas emissions in industry bring our climate and ultimately the earth system out of balance." The researchers propose a deeper transformation that points to a fundamental reorientation of the human values and is based on a more equitable distribution of resources and more environmentally conscious behaviour. The researchers are aware that change cannot be achieved quickly, but the path must soon be taken (see Schrader, 2018)

Infrastructure and urban development in the 21st century

The world faces many challenges that can affect wellbeing and happiness. Rapid urbanisation and scarcity of resources are among the most serious problems.

In urban planning, infrastructure and urban development are important for shaping a desirable future for our planet. Urban planning and urban development play a crucial role in protecting the environment and human health. Every day around the world 200,000 people move to urban areas where they need healthy, affordable and sustainable housing and infrastructure. However, the traffic volume and the building and infrastructure facilities increase greenhouse gas emissions enormously. (See: Rockström, 2014) (See: DIE WELT, 2018) (See: Ochs, 2018)

Furthermore, the countries of Europe have to adjust to higher temperatures, drought, heat and heavy rain. The climate forecast for Ludwigsburg in Baden Württemberg predicts a Mediterranean climate in thirty years like it is today in Avignon in southern France. That means mild winters and hot, dry summers with many tropical nights (over 20 degrees Celsius). Fabian Dosch from the Federal Institute for Building, Urban and Spatial Research in Bonn therefore suggests the following measures: drinking water dispensers in public spaces, fixed awnings or umbrellas, planting trees that provide shade and larger areas of water. For example, it is particularly important to build reservoirs for rainwater in order to control the effects of heavy rainfall and to be able to use water in the event of drought. Thanks to these reorientations, our cities can remain livable. (See: Ochs, 2018)

Need for university cooperation

Since humanity is confronted with many problems, European universities have to work together more intensively to research alternative solutions for society.

The goal of this work by researchers or students cannot be individualisation, but more common ground. European society should continue to develop social life, for example on topics such as digitisation and sustainability, through less competition between universities and through joint research developments. Findings from discussions, creativity, intellectual connections, social skills and flexibility should be the basic values for joint research development.

"For example, the University of Freiburg relies heavily on interdisciplinary research networks. Researchers and scientists from various disciplines can devote themselves to their research project

for a limited time. This creates freedom for scientific creativity, which makes it possible to discover new questions, think about the unusual and initiate joint projects. "(Advertisement from the University of Freiburg, 2019). The results of these educational assignments from universities can secure jobs for environmentally friendly projects in Europe, especially in times of dwindling resources but great demand for environmentally friendly innovations. In future, economic success will therefore be based on innovations and inventions of sustainable products in connection with digitalisation.

With reference to French President Macron's remark that "Europe must grow closer together through more education", universities should strive for closer cooperation. Because Europe can only win the future through education, increased cooperation and above all through interdisciplinary thinking.

Education increases people's adaptability to any kind of change in personal life and promotes technological and social innovations in society.

For six years now, professors from Babes Bolyai University have been holding a conference entitled - "Fit for the future through talks between the university and business. How companies and universities are adapting to the future challenges of sustainability and digitalisation"- through. The conference is always held in February or March. In the future, students will discuss problems and theses of coursework both via the Internet and by visiting the students of the other university.

Doctoral degrees, bachelor's or master's theses are individual scientific papers. Individual academic achievements and student competition will continue to be an important basis of university education in the future. Mutual and scientific exchange with students can enrich the individual academic performance, especially if students from other faculties or even from foreign universities work on different topics. With such cooperation trust can be strengthened and honest willingness to discuss the tasks of the other participants can be shown. The German University Rectors' Conference (HRK) recommends: "A particularly large number of qualified scientists working on related topics is particularly suitable, so that mutual support and scientific exchange can occur. These discussions do not necessarily have to take place in the same place, but can also be ensured through cross-regional networking. Outstanding research also requires an international framework (with a few exceptions). "(German University Rectors Conference, 2012) (Köhler, 2016).

Report on the conference on February 26, 2019 at Babes Bolyai University

The German-language faculty of economics at the Babes Bolyai University in Cluj Napoca chose this year's title "Fit for the future through discussions between the university and the business community" for the annual conference. How companies and universities are adapting to the future challenges of sustainability and digitalisation".

Under the motto "Find ideas and inspiration together through lateral thinking" video conference workshops were held at the "FSEGA".

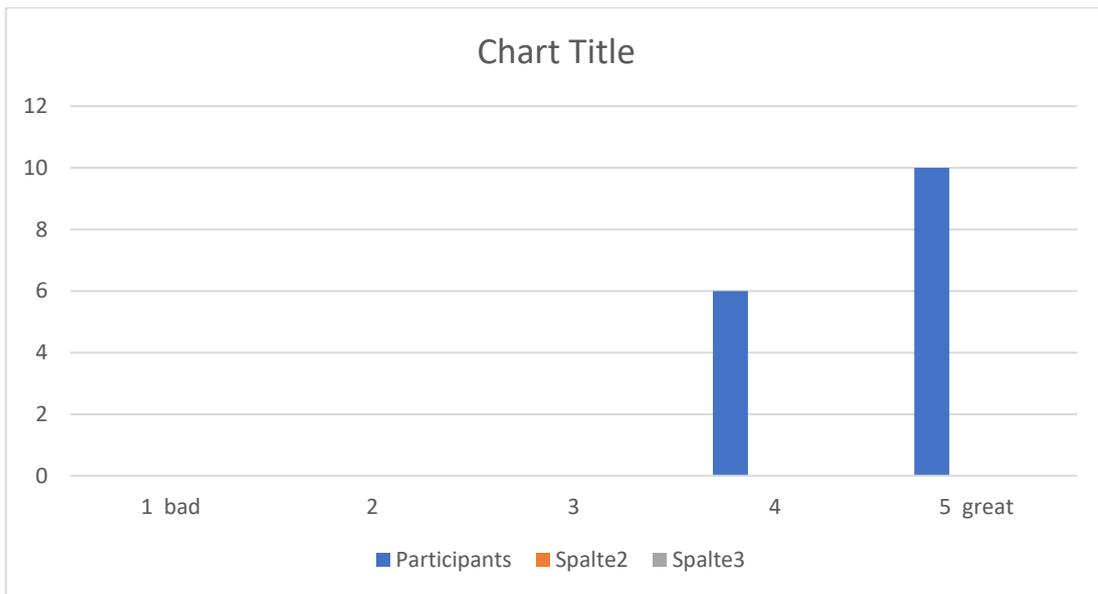
Six students from Bottrop University of Applied Sciences and ten students from Babes Bolyai University worked out additional suggestions, considered changes and innovative solutions in a workshop for their bachelor or student theses. Each student made the basic structure of the work available to the other students and each of them made a suggestion for additions or changes to each synopsis of the sixteen participants, both in the video conference and in the workshop. In the video conference and workshop, the students discussed the suggestions for their work. After discussion about each work, the moderator noted the intermediate results and the results on a projector.

The sixteen participants of the workshop presented their version in the conference and the proposals were evaluated the next day in the overall conference. The bachelor's or student's thesis of each participant can then be further developed with the new inspiration.

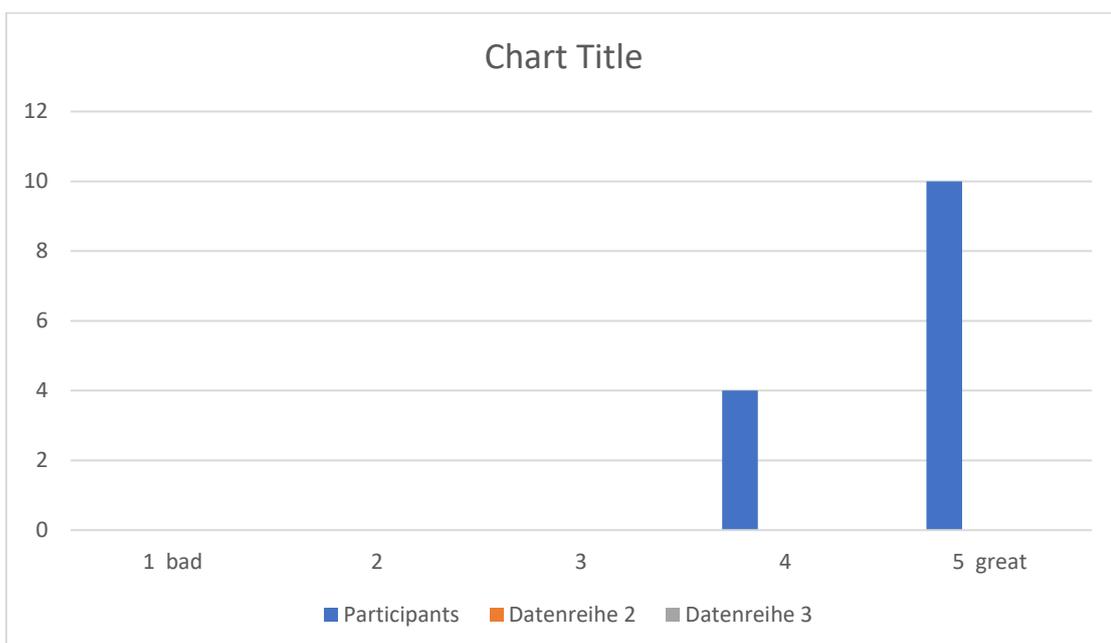
After the workshop, the participants answered the following questions:

Figure 1: Evaluation - Statement by the 16 participants in the workshop. (3 questions)

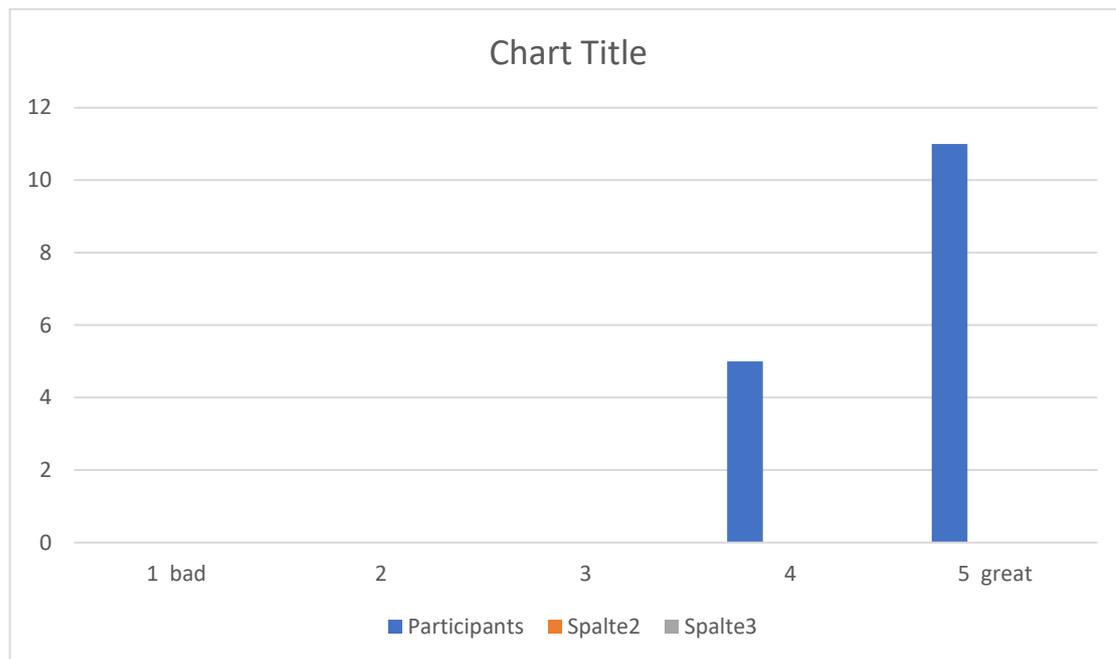
1. How did you like the workshop? The participants were able to choose five evaluation levels, from bad to great.



2. Is working with other students valuable in your work?



3. Do you gain new knowledge by working with students from other faculties?



The answers of the participants show a very high satisfaction with the workshop (the evaluation only shows the impression of the participants directly after the conference and is not representative)

Conclusion

"The greatest challenge in the 21st century is to enable everyone to live in dignity without destroying our planet." (Köhler, 2016). Our European society has to solve new challenges of sustainability and the digitised world every day, almost every hour.

Solutions to these challenges can be improved through close co-operation and through coordinated agreements between the university and industry. In the last six conferences at the Faculty of Economics at Babes Bolyai University, politicians, entrepreneurs and professors have unanimously advocated the basic skills needed in the future, such as creativity, flexibility and social skills, through interaction, through discussions and projects (e.g. : To promote student research on topics such as sustainability and digitalisation).

The described interdisciplinary cooperation in education could promote the understanding and solidarity of students and young researchers from different European countries and through the mutual ingenuity of innovative results could positively influence the future of Europe. Such measures - "Working from the university into the society of Europe" - can strengthen the togetherness of the people of Europe and shape the future of Europe through European inventions on the topics of sustainability and digitalisation.

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Influence of Solution Heat Treatment on Toughness of Solution Heat Treatment on Toughness of Zinc-Aluminum (ZA5) Solder Alloy

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Abstract

This study investigated toughness properties of ZA5 alloy. Toughness properties of ZA5 solution heat treated were investigated. ZA5 alloy material was prepared in the laboratory and cast into rods of 15 mm diameter and 200 mm length. A sample of the cast rods was solution heat treated at 100°C for 6 hours, while another untreated sample which served as control was also prepared. The samples were evaluated for toughness and modulus of toughness on the Universal testing machine. Results showed that ZA5 alloy material exhibits superplastic behavior at low flow stress. Solution heat treatment performed on the alloy significantly modified the structure of the alloy, and increased the toughness and modulus of toughness of the alloy. Solution heat treatment at 100°C for 6 hours, the toughness of the ZA5 alloy can be used to improve the toughness of ZA5 alloy. In general, solution heat treatment of ZA5 alloy for 6 hours at 100C influenced the properties of the alloy material.

Keywords: Solutionizing, Toughness, Modulus of toughness, ZA5

Main Conference Topic: Engineering

Introduction

Zinc-Aluminum (ZA) alloys are important industrial alloys available for various engineering applications. Distinctiveness, antifriction capability, corrosion resistance and technological properties, mainly relating to their excellent castability and cutting machinability, make ZA alloys promising material for industrial applications (Elzanaty, 2014; Peter et al., 2018).

Since they were introduced in the early 1970s, various investigations have been carried out on this family of engineering materials to broaden the scope of areas where they can be usefully applied. Particularly, research efforts have been made to understand the phenomenon of dendritic segregation in these alloys (Peter et al., 2018); effects of casting/processing techniques of structural formations in the ZA alloys (Seenappa and Sharma, 2011; Chen et al., 2015; American Society for Metals, 1972). Efforts were also made to investigate mechanical properties (Seenappa and Sharma, 2011; Adedayo and Abdusalam, 2018; Adedayo, 2019), however mostly, tensile properties of these alloys were more studied. Only few studies have reported research efforts on ZA5, one of the important materials in this family of alloy. No research efforts have reported investigations on the toughness of ZA5 alloy. To meet the growing demands for application of these alloys in industry, extensive studies on microstructural changes and phase transformations which occur during various thermal and

thermo-mechanical processes are required (Zhu, 2004). Generally, understanding mechanical properties of materials is very important (Roylance, 2001; University of Cambridge, 2018; Thirumalvalavan and Senthilkumar, 2019; Panwar and Chauhan, 2018) to provide knowledge which is vital and useful for design and many other important engineering applications.

Therefore, in this present study, investigation into toughness property of ZA5 is made. The influence of solution heat treatment at 100°C for 6 hours on the toughness of the alloy is investigated.

Materials and Experimental Procedure

The material used for the study is zinc aluminum alloy (ZA5). This material was produced by melting together and casting zinc and aluminum metals. About 9Kg of Zinc metal scrap was melted in a lift-out crucible furnace, after which about 0.5Kg of Aluminum was dissolved in the molten zinc metal. The molten metal alloy mixture produced was cast into rods of 15mm diameter and 200mm length in sand molds. The quantitative elemental chemical analysis of the cast rods was carried out with optical emission spectrometer. Result of the chemical analysis test is presented in Table 1. Produced cast rods were machined into ASTM standard tensile and impact test pieces on a lathe machine for evaluating fracture energy and toughness of the test pieces. Two test pieces each were produced from the cast rods for each test, fracture energy and toughness. One test piece served as control specimen, while the other test piece was heat treated at a temperature of 100°C for 6 hours, after which the sample was removed and quickly quenched in water maintained at a temperature of 10°C. Both rods were then evaluated for fracture energy on Universal Testing Machine, and toughness on the Hounsfield impact testing machine. The stress-strain curve of the samples from testing on the universal testing machine was equally obtained for further analysis.

Results and Discussion

The results of the study are presented in Tables 1 and 2 and Figures 1 to 5. Table 1 presents the results of the elemental chemical analysis of the produced ZA5 alloy. Table 2 and Figure 1 show the result of the toughness test and fracture energy evaluation by the Hounsfield Impact testing machine and Universal Testing Machine. Figures 2 and 4 show the stress-strain curves for the untreated (control) sample and the solutionized sample respectively. The microstructures of the control and the treated samples are presented in Figures 3 and 5 respectively.

Table 1: Chemical composition of the ZA5 alloy

	<i>Mn</i>	<i>Si</i>	<i>Cu</i>	<i>P</i>	<i>Cr</i>	<i>Ni</i>	<i>V</i>	<i>B</i>	<i>Al</i>	<i>Mg</i>	<i>Na</i>
Mean (Conc. %)	0.13	0.12	1.47	<0.0005	0.005	0.12	0.002	0.0135	15.4104	0.0005	<0.0001
	<i>Ca</i>	<i>Ti</i>	<i>Zr</i>	<i>Fe</i>	<i>Ag</i>	<i>Zn</i>	<i>Sn</i>	<i>Sb</i>	<i>Pb</i>	<i>Co</i>	
Mean (Conc. %)	0.0003	0.003	0.001	0.036	0.035	>79.0	0.002	-	3.74	0.004	

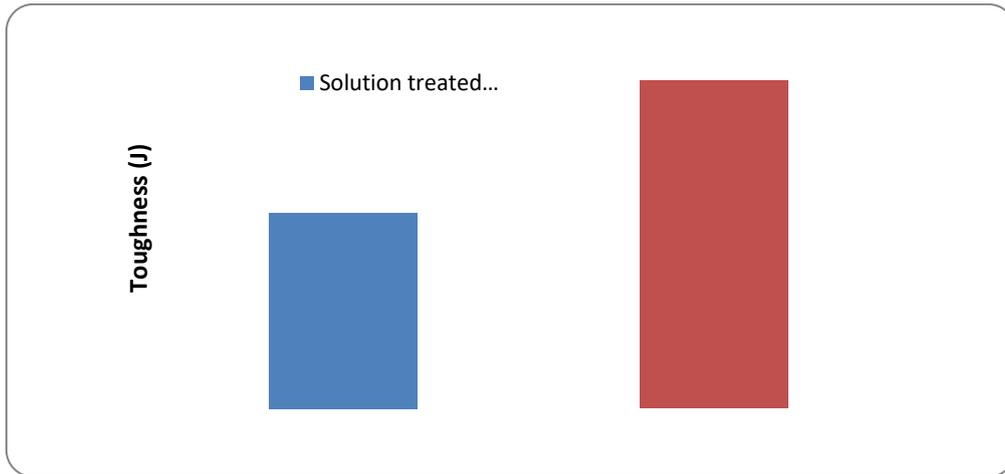


Figure 1: Toughness values of the tested samples of ZA5 alloy

Table 2: Toughness values of the tested samples of ZA5 alloy

Sample	Toughness (Joules)	Fracture Energy (Joules)
Solution treated ZA5	20.54	1.24
Untreated ZA5	34.41	0.56

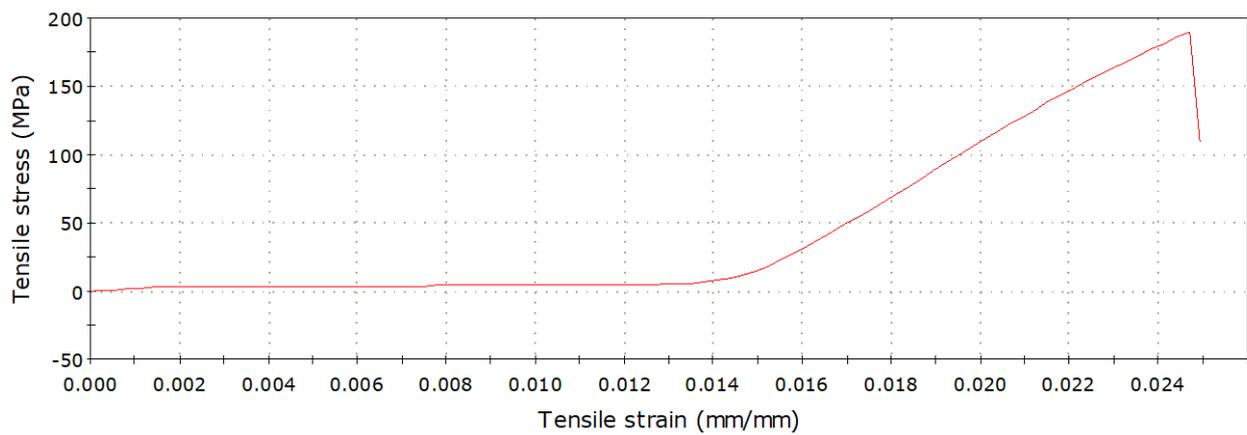


Figure 2: Stress-Strain curve for control sample



Figure 3: Microstructure of control sample

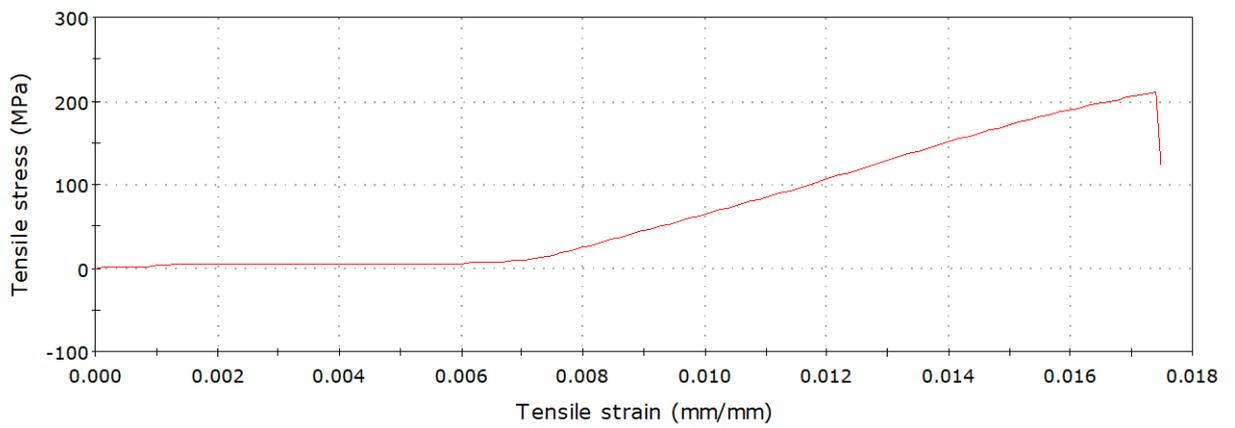


Figure 4: Stress-Strain curve for solutionized sample

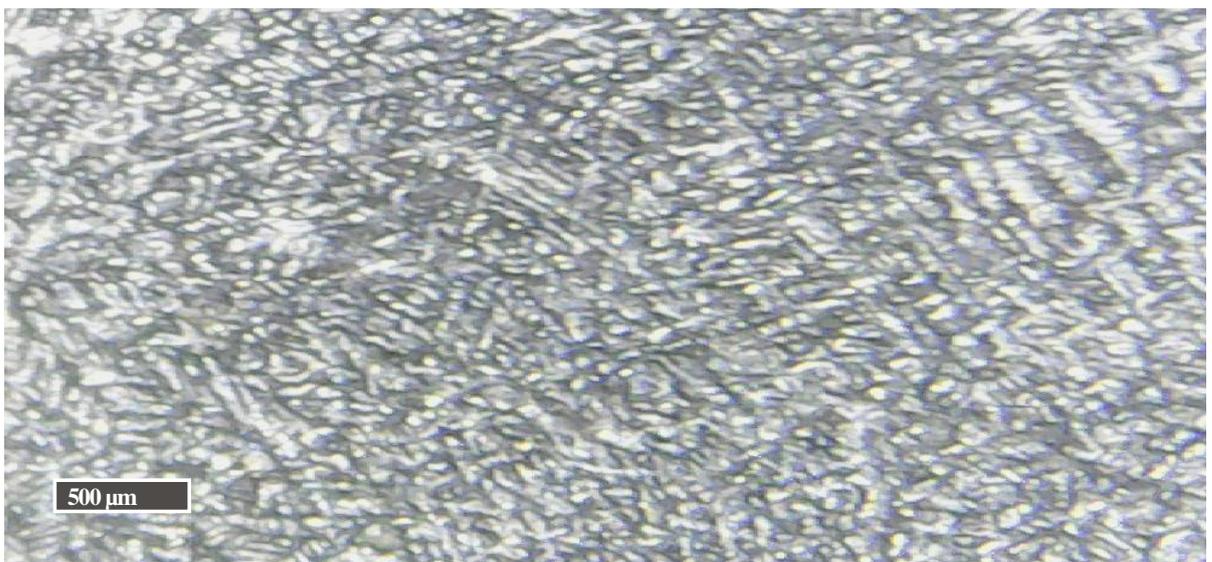


Figure 5: Microstructure of solutionized sample

Table 2 and Figures 2 and 4 present toughness and fracture energy test results measured by the Hounsfield Impact testing machine and Universal testing machine respectively. The result shows that the untreated (control) sample had higher toughness value of 34.41J, while the solution heat treated sample had a lower toughness value of 20.54J. The untreated (control) sample had fracture energy of 0.56J while the solution heat treated sample had higher fracture energy value of 1.24J. The fracture energy values are rather low and indicative of the concave-up (J-type) stress-strain curve (Roylance, 2001; University of Cambridge, 2018) observed for the samples. J-type stress-strain curves normally exhibit low area under the stress strain graphs, indicating low energy absorption during the deformation of samples by tensile tests (University of Cambridge, 2018). Materials exhibiting J-shaped stress-strain curves can be extremely tough, even though the fracture energy for the material is not particularly high (University of Cambridge, 2018). This toughness arises for the fact that lower part of the J-shaped curve gives very large extension for low applied stress, so the shear modulus in this region is very low and so there is no mechanism whereby the released strain energy on fracture can be transmitted to the fracture zone. Areas of large extensions for low applied stresses are seen in Figures 2 and 4. The material gets stiffer as the failure point approaches ensuring that very large extensions require large stresses. Since the J-shaped curve is concave, the area under the curve up to a given extension is far lower than that for the equivalent Hookean curve meaning that the energy released in the fracture of a material with a J-shaped stress-strain curve is far lower than the energy released when an equivalent Hookean material fails. Since the release of energy drives crack propagation, a material that releases less energy on fracture is tougher.

The improved fracture energy values of the solutionized specimen can be due to the fine and stable grain size of the aluminum-rich (α -phase) and zinc-rich (β -phase) terminal solid solutions superplastic microstructure formed during solution treatment of the alloy at 100°C (American Society for Metals, 1972), which has improved the energy release during fracture. Normally, smaller plastic zone size in plane strain results from the triaxiality of the stress state, which restricts plastic yielding. Superplastic states have been reported to improve elongation (Seenappa and Karma, 2011; American Society for Metals, 1972). Improvement of the material property leads to improved fracture energy observed for the solution heat treated ZA5 alloy. The presence of superplastic structure is confirmed in the micrograph of solution heat treated sample presented in Figure 5

Conclusion

The result of the investigation showed that ZA5 alloy has low toughness values for both treated and untreated samples. This alloy in the as cast and solution heat treated states; exhibits superplastic condition, where low flow stresses brings about high elongation in the material. By Solution heat treatment at 100°C for 6 hours, the toughness of the ZA5 alloy can be used to improve the toughness of ZA5 alloy. In general, solution heat treatment of ZA5 alloy for 6 hours at 100C influenced the properties of the alloy material.

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Identifying Potential Collaborators with Relevant Skills

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Abstract

Collaboration is a problem-solving technique, a tool for innovation, and an attribute of organizational culture has been identified as one of the top interests in science policy issues. Therefore, one of the crucial factors that determine the success of a collaborative project is sourcing for appropriate collaborators. In this study, attempt is made to design a scheme to identify potential collaborators with relevant skills. The approach methodology adopted is design of a rational scheme that uses attributes of publications of candidate collaborators to compute the appropriateness of the candidate. The scheme developed showed that attributes such as positions of potential collaborator in author lists of his publications, number of citations made to the published works of the author in real sections of other publications, are considered useful and relevant parameters required to determine the potential of a candidate to serve as a collaborator.

Keywords: Characteristic Score Scale, Collaborations, Collaboration Skills, Citations

Main Conference Topic: Academic Research Projects, Educational Management, Engineering and Sciences Research

Introduction

Collaboration has been identified as one of the top interests in science policy issues. It is defined as arrangement between two or more people or organizations to work together to realize or achieve a goal. Research collaboration is a sophisticated cooperative arrangements among individuals, groups, departments, institutions, sectors and countries (Voutilainen and Kangasniemi, 2015; Katz and Martin, 1997), and it has become the norm in every field of scientific research (Lee and Bozeman, 2005; Beaver and Rosen, 1979). Collaboration is a problem-solving technique, a tool for innovation, and an attribute of organizational culture that can lead to break-through solutions, creative ideas that lead to pivotal changes, and describe organizations where people effectively work across boundaries to produce spectacular results (Stoner, 2015).

Collaboration in science has been the subject of many studies (Thijs and Glanzel, 2010). Some of the works studied include: Adedayo, (2017a,b); Lee and Bozeman, (2005). All these works have shown positive effects and versatility of collaboration on scientific productivity and managerial solutions. The arguments are that: much collaboration is based on the joint use of expensive or unique equipment without which research would be, not only less productive but also impossible; some researches require collaboration to bring special expertise and knowledge not otherwise available but crucial to research outcomes. Often, tacit knowledge

and knowledge of technique are best conveyed through collaboration; particularly for mentoring students and trainee researchers/scientists (Lee and Bozeman, 2005). However, despite these good reasons to expect positive outcomes in scientific collaborations; equally, there are propositions as to why collaboration may undermine productivity. Landry and Amara, (1998) cautioned that transaction costs are usually an unavoidable consequence of working with others. Staying in touch by various media, engaging in social ingratiation, waiting for others to comment, respond, or do their part of the research - these are just some of the factors taking time and energy even in the best collaborative relationships (Lee and Bozeman, 2005).

Therefore, one of the crucial factors that determine the success of a collaborative project is sourcing for appropriate collaborators. Appropriateness of a collaborator is determined in terms of relevance of skills, skill proficiency and collaborative strength. Evaluation of relevance of skill of potential collaborator is required to know whether the skill can support the collaborative project. To evaluate relevance of skill of a potential collaborator, the idea proposed by Adedayo (2015, 2016) was adopted. Determination of skill proficiency is equally required to know whether the collaborator can contribute meaningfully in the area of need better than other collaborators. For this, the approach as inspired by methods of Glanzel and Schubert, (1988); Glänzel et al., (2016) and Bornmann and Glanzel, (2016) were used. In collaboration, it is required that a collaborator contributes meaningfully and adds to the quality of the project better than other collaborators on board in the area of need. If other collaborators on board can discharge equal level of competence in the area of need, then there is no justification to recruit other persons to serve the need. Therefore, in this study, a scheme for identifying required skillful potential collaborators from attributes of published works of the collaborator is presented. A rational approach to determine appropriateness of a candidate as a potential collaborator is made. The study forms one of the first rational approaches that attempts to identify required skillful potential collaborators from attributes of published works of the collaborator. In this context, the study is original and of great potentials.

Study Methodology

The identification of potential skillful collaborators is computed based on the attributes of publications of candidate collaborators. In this scheme, the average sum of the position of the candidate in the author list in all publications where the candidate has been listed as an author is considered (Adedayo, 2017a,b). The position of the candidate in the author list is expressed to be proportional to the weighted fraction of his skill in the published works. Therefore, the weighted fraction of candidate author skill based on his authorship position in his specific publication cited in the real section of another publication is expressed as:

$$S_p = \frac{(n_i - r_i + 1)}{n_i^2} \quad (1)$$

Where S_p is the weighted fraction of author skill based on authorship position, n is the total number of author listed in the publication cited in real section, and r is the position of the candidate in the author list.

Also, relative frequencies of citations of the candidate author in real sections of relevant publications are equally considered. For this purpose, only citations made in the real sections of the publications are counted and considered. Adedayo (2015, 2016) classified citations made in a manuscript into two. These are citations made in the imaginary section and citations made in the real sections of the manuscript. It is only citations made within the methodology and/or results and discussions that reflect the relevant skills of the cited candidate author. The

frequency of citation to an author within the methodology and discussion of result sections reflects the preference of the cited authors skills over other authors similarly cited in the methods and discussion of results sections. This is an indication of the level of quality of the skill of the cited author. For example, an author that has been cited thrice is adjudged to have more impactful skill than the author cited once. For most articles that report empirical studies, the practical of the work reported actually starts from the methodology. It is here that the skills of the authors manifest. Any sections written before the methodology are just to set premise for the article. The pertinence, and therefore, the impact of citations made in these sections to the research being reported can only be imagined. Therefore, the weighted fraction skill of the candidate author based on his citations in real sections is computed as:

The weighted fraction skill of candidate author based on his citations (S_c) is defined as thus:

$$S_c = \frac{f_{Ri}}{\sum_{i=1}^{n_R} f_{Ri}} \quad (2)$$

Where f_{Ri} is the frequency with which candidate author publication i has been cited in the real sections which consist of methodology, results, and discussion of results. $\sum_{i=1}^{n_R} f_{Ri}$ is the summation of the frequencies of citations of n_R authors cited in the real sections which consist of methodology, results, and discussion of results. n_R is the total number of authors cited in the real sections which consist of methodology, results, and discussion of results. The effective weighted fraction of candidate author skill is thus computed as:

$$S_w = \sum_{k=1}^N \left\{ \frac{n_i - r_i + 1}{n_i^2} \cdot \frac{f_{Ri}}{\sum_{i=1}^{n_R} f_{Ri}} \right\}_k \quad (3)$$

Where k indicates a particular publication where a candidate author has been cited, and N indicates the total number of publications where candidate author has been cited in real sections.

Classifying Skills of Candidate Collaborators

To classify candidate collaborators for knowing whether they have appropriate skills required for collaborative project, the Characteristic Scores and Scales (CSS) methods were adopted. CSS approaches were introduced in the 1980s (Glanzel and Schubert, 1988). This method has been equally applied by Glänzel et al., (2016) and Bornmann and Glanzel, (2016). In the CSS method, characteristic scores are obtained from iteratively truncating samples at their mean value and recalculating the mean of the truncated sample until the procedure is stopped or no new scores are generated. The mathematical description as applied to classifying effective weighted fraction of candidate author skill (S_w) is as follows.

In the first step the mean S_w is calculated for all candidate authors cited in real sections of papers with relevant methods. All candidate authors with S_w values below the mean are classified as “poorly skilled”. Authors with S_w values above the mean are used for further calculations in the second step. For these authors, the mean S_w values is calculated again and the authors with S_w values below the mean are designated as “fairly skilled”. In the third step the procedure of mean calculation and separation of two groups is repeated which results in two further impact groups labelled as “remarkably skilled ” and “outstandingly skilled” authors.

Conclusion

A scheme for determining skills of a potential collaborator has been developed. The scheme works on measuring publication attributes of the published candidate collaborator. Attributes such as positions of potential collaborator in author lists of his publications, number of citations made to the published works of the author in real sections of other publications, are considered useful and relevant parameters required to determine the potential of a candidate to serve as a collaborator.

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Multicultural Approach to the Formation of Motivation a Healthy Lifestyle and Active Longevity

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Abstract

The publication presents a model of a multicultural approach to motivating a healthy lifestyle and active longevity, describing four interconnected and subordinate subsystems (social environment, extended family, nuclear family and individual) and the stages of its implementation in the framework of the project “Longevity, lifestyle and nutrition: the importance of education”.

Keywords: multicultural approach, healthy lifestyle, active longevity

Main Conference Topic: Computer Science, Security and Information Technology (alter with the topic that relates to your paper) Education, Teaching and Learning

Introduction

According to the data of the World Health Organization, over the years there has been an increase in life expectancy of the population, aging of the population. However, despite the increase in life expectancy, the main issue of the demographic policy of many countries remains the issue of active longevity, one of the key factors of which are the various components of a healthy lifestyle.

Lifestyle, health, longevity are a holistic system that operates in certain socio-psychological, environmental and cultural conditions. The choice of lifestyle, on the one hand, is objectively determined by the prevailing socio-psychological, environmental, cultural and other conditions in a given society, on the other hand, is determined by the subjective set of life values of the individual.

Related work

L. S. Vygotsky (1896-1934), a soviet psychologist, pointed out that each cultural form of behavior arises initially as a form of cooperation with other people, as an imitation of another or an appeal to an adult; only at the next stage does this form become an individual function of the child himself. Initially, the behavior of a child is a social form of cooperation with an adult. Thus, parents are the first significant figures in the formation of a healthy lifestyle.

Uri Bronfenbrenner (1917-2005), an American psychologist, created the psychological theory of ecological systems, according to which the "psychological ecology" of a person is considered as a combination of such subsystems as a family microsystem, a mesosystem of a local communication and living environment, an exosystem of large social organizations and a macro system formed by a combination of cultural customs, values and customs.

Model

Based on the work of L.S. Vygotsky and Uri Bronfenbrenner, we developed a model of a multicultural approach to motivating a healthy lifestyle and active longevity. The model is shown in Figure 1.

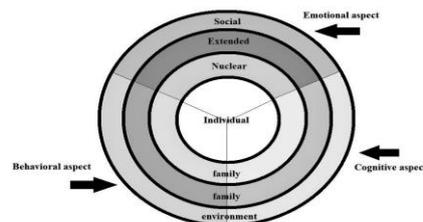


Figure 1: Model of a multicultural approach to motivating a healthy lifestyle and active longevity

Implementation

The implementation of the model of a multicultural approach to the formation of motivation for a healthy lifestyle and active longevity is being carried out in the framework of the Belarusian-Italian project "Longevity, lifestyle and nutrition: the importance of education". The project brings together the efforts of universities and research institutions of the two countries, professionals from different fields of activity: medicine, pedagogy, psychology, representatives of Belarus and Sardinia (Italy) public organizations for mutually beneficial cooperation in carrying out activities aimed at improving the quality of life of the population of the two countries.

The main objectives of the project "Longevity, lifestyle and nutrition: the importance of education":

- conducting research on the longevity of residents of the Republic of Belarus and residents of the island of Sardinia (Italy) to develop and promote measures to form an active lifestyle of older people;
- combining the efforts of professionals from various fields of activity (medicine, pedagogy, psychology), representatives of Belarus and Sardinia (Italy) public organizations with the goal of mutually beneficial cooperation in conducting activities aimed at improving the quality of life of the population of the two countries;
- dissemination of research results through activities of various nature (seminars, workshops, organization of the "Summer School", publication of research results, etc.).

Results

The results of the multicultural approach to the formation of motivation for a healthy lifestyle and active longevity can be represented through the characteristics of the cognitive emotional and behavioral aspects of each subsystem (social environment, extended family, nuclear family, and individual).

Social environment. The main goal should be the creation of conditions for active, creative, professional longevity, developed programs aimed at creating a healthy lifestyle. Cognitive aspect: the presence of clear and consistent norms and criteria for a healthy lifestyle. Emotional aspect: the presence of a system of emotional encouragement for people leading a healthy lifestyle and long-livers. Behavioral aspect: event organization to promote a healthy lifestyle and active longevity [1].

Extended family. One of the most important indicators is the presence of family values and patterns of behavior aimed at the formation and maintenance of a healthy lifestyle and active longevity. Cognitive aspect: the presence of models of a healthy lifestyle and longevity among relatives in different generations. Emotional aspect: the presence of positive experiences associated with stories of longevity in different generations. Behavioral aspect: maintaining actions related to a healthy lifestyle and active longevity.

Nuclear family. Parents influence their child's behavior by encouraging or condemning certain types of behavior. Cognitive aspect: the presence in parents' self-images of self-image as active long-livers. Emotional aspect: the presence of positive experiences associated with a healthy lifestyle and longevity. Behavioral aspect: the implementation by parents of stereotypical behavior that contributes to the formation of a healthy lifestyle.

If the process of interaction between the social environment, the extended and the nuclear family is successful, taking into account the patterns of development of motivation, the cognitive, emotional and behavioral aspects of a healthy lifestyle and active longevity in an individual will be presented as follows. Cognitive aspect: the formation of a person's ideas about a healthy lifestyle. Emotional aspect: the presence of positive experiences associated with ideas about a healthy lifestyle and about yourself as a future long-liver. Behavioral aspect: the presence of activity aimed at maintaining a healthy lifestyle [2], [3], [4], [5].

Conclusion

Thus, to implement a multicultural approach to the formation of a value-based attitude to health, a new concept and a comprehensive education and upbringing program are needed that are built taking into account the psychological factors in shaping a healthy lifestyle and creating a longevity cult.

A comprehensive program of a multicultural approach to motivating a healthy lifestyle and active longevity should be based on a conceptual understanding of the impact of public opinion attitudes on a healthy lifestyle, on developing an understanding of the value of health, increasing responsibility for one's health, on developing the ability and need to take care of one's own health and the health of others.

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Current standards in managerial decision-making

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Abstract

Businesses development in competitive environment faced the managers with series of challenges. The solution requires a successful decision-making. The success of decision-making is also conditioned by the methods the managers uses in decision-making. This situation opens up new opportunities for managers to use advanced (analytical) methods in decision making. Analytical methods compare with intuitive methods, generally ensure success because analytical methods derive from scientific studies therefore they ensure fast, correct and reliable solutions. Accuracy level is not the same in the different analytical methods of decision-making. In this context, managerial abilities should aim finding analytical method more efficacy for economic problem on the focus of decision-making. Through the questionnaire enabled the perceptions measuring of managers in three regional countries (Albania, Northern Macedonia and Montenegro) for decision-making methods. Findings offer important information for manager, who faces competition. They must use the efficient decision-making methods that ensure successful performance in business.

Keywords: business performance, managerial ability, decision-making, intuitive methods

Main Conference Topic: Academic Journal of International Economics and Management Research

Introduction

Decision-making is a relatively studied field from different perspectives like increasing production, lowering costs, etc. All of these are mainly related to the method used in decision making, which also affects to a considerable extent the business performance. "Decisions are the coin of the realm in business. Every success, every mishap, every opportunity seized or missed is the result of a decision that someone made or failed to make" (Rogers and Blenko, 2006).

Financial performance has constituted and constitutes a focal point that focuses the attention of managers, who through continuous decision making aim to achieve business objectives. Considering the day-to-day commitment to decision making, Rosanas (2013) stated:

“Decisions are an everyday fact of life” because they involve commitments, tasks, objectives and interests that confront the management team with numerous problems and challenges.

Successfully meeting challenges enables a positive business performance. Positive performance makes interested not only management but all human resources in business. It is only achievable thanks to a quality decision maker by the manager. Quality of decision making refers to the methods of decision making. Decision-making methods have evolved over time. This evolution is attributed to human endeavors referring to quality. According to Covina, Slevin and Heeley (2001), Nygren and White (2002), Dane, Rockmann and Pratt (2012) the decision-making methods are classified into the following two groups:

- a. Intuitive methods, which are methods that are based on descriptive modes of economic phenomena and the manager's personal experience.
- b. Analytical methods are methods that represent an interplay between science and its application in practice.

Zander, Horr, Bolte, Volz, (2016) express that intuition in decision-making has been connected two assumptions: 1) Tacit decision - previous decisions are affecting and 2) Explicit decision - emotions are affecting. While, Sanderson and Gruen (2006) regards to analytical methods thought that these methods can draw on 'hard' and 'soft' information, and can be participative, explainable and justifiable.

The manager's choice of decision-making method is not a matter of manager's will, but depends on a number of factors, including the ambiguity of the business environment and the limitations of human knowledge on decision-making methods.

On the whole, business performance is difficult to evaluate. Therefore evaluation of financial performance is best enabled through its characteristic indicators. They are numerous and varied.

LRATIO

Although according to Robinson et al. (2015) there are some liquidity ratios for which they state: “There are many liquidity ratios used by organizations to manage their liquidity such as (current ratio, quick ratio, cash ratio, defensive interval ratio) which can greatly affect the financial performance of companies”. In this paper a quick ratio is considered, as a quick ratio indicates that the company may have problems meeting its short-term obligations. Gibson (2009) also points out that: “On the other hand, improvement in the value of these ratios can lead to a recovery in the liquidity of companies, which may reflect positively on the volume of activity, and therefore on its financial performance”. The importance of this indicator of business performance has attracted the attention of researchers. There are numerous scholars who appreciate the importance of liquidity ratios. For this also Robinson et al., (2015) point out that: “Literature review covers the relationship between liquidity ratios and profitability of firms”. Because “Liquidity management is achieved through the effective use of assets” (Robinson et al., 2015).

Return of Investment (ROI)

ROI is an indicator that directs businesses to determine investments in specific economic activities, choosing among them according to a hierarchy of importance. From this point of view ROI is an indicator that also focuses on managers' attention. The importance of this indicator lies not only in its accuracy as an indicator, but also in the fact that it characterizes the financial performance of the business. For this, Phillips and Phillips (2005) acknowledge that: “The concept of ROI has been used for over 300 years as a business tool” and then states: “Finally, an ROI value is generated, as the cost of coaching is compared to the monetary benefits of the business impact measure”.

Methodology

The main objective of this paper is to evaluate the impact of using decision-making methods on decision quality and business performance. The study covers all food industry businesses operating in the capitals of the three Balkan countries (Albania Montenegro and Northern Macedonia). A total of 167 businesses were analyzed. The study presents data from current and previous practices regarding decision-making methods. The data were processed using the statistical method “Least Squares”. The focus of this paper is to discuss managers' perceptual dimensions of the impact of decision making methods on business performance.

Results

Data analysis is treated in two ways:

- a. Analysis of field data on managers' perceptions of the decision making method
- b. Financial performance analysis of the analyzed businesses.

a. Analysis of field data on managers' perceptions of the decision making method

The overall trend of business managers surveyed is guided towards intuitive decision-making methods. Field data show that over 86.3% of managers surveyed refer to intuitive methods in business decision-making. It is important to document how much and what way decision-making methods affect business performance. This can be achieved by analyzing managers' perceptions of decision-making methods.

Intuitive methods

Referring to table data 1 deriving from the field data processing for the LRATIO indicator the situation is as follows:

Table 1: Impact of intuitive methods in LRATIO

Dependent Variable: LRATIO

Method: Least Squares

Sample: 1 167

Included observations: 165

Excluded observations: 2

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-3.341481	3.073665	-1.087132	0.2786
Q418	0.040724	0.644217	0.063215	0.9497
Q419	0.770186	0.576909	1.335021	0.1838
Q420	-0.511766	0.628893	0.813756	0.4170
Q423	1.062976	0.596568	1.781818	0.0767
Q425	0.183108	0.539696	0.339279	0.7348
R-squared	0.040943	Mean dependent var		1.697670
Adjusted R-squared	0.010784	S.D. dependent var		6.822701
S.E. of regression	6.785812	Akaike info criterion		6.703231
Sum squared resid	7321.511	Schwarz criterion		6.816174
Log likelihood	-547.0165	F-statistic		1.357581
Durbin-Watson stat	2.045005	Prob(F-statistic)		0.243175

As can be seen, five statements that focus on managers' attitude towards intuitive methods of decision making are analysed, specifically:

Q 418 - I feel the need for training in the field of decision making

Q 419 - Usually I make quick decisions because I consider what is valuable at the moment of decision making

Q 420 - I always rely on my intuition when making decisions

Q 423 - Intuitive methods have proved me to be successful in general

Q 425 - I make decisions independently

Of the five statements, only Q423 results in an acceptable signification. The relationship between the LRATIO financial performance indicator and the variable factor can be given by the following relation:

$$y = -3.341481 + 1.062976 * x_1$$

where:

y - financial performance indicator LRATIO

-3.341481 – constant

x₁ – Intuitive methods have resulted more successful in general

The relation between the independent variable LRATIO and the dependent Q423 expresses the consolidated opinion of managers regarding their evaluation of intuitive methods. Based on Giardini, Coricelli, Joffily and Sirigu (2008): “Most people hold unrealistic positive beliefs about their personal skills, their knowledge (Fischhoff, Slovic, & Lichtenstein, 1977)”. This assessment also explains the non-impact of the other statements analyzed. Sinclair (2011) highlighted: “Recent research into the role of emotions and expertise also indicates that intuition is more contextual than we thought (see, e.g., Baylor 2001; Coget, 2004; Sinclair, 2011)”. Making decisions based on intuitive methods considers the manager's individual experience. However, Sinclair (2005) said that intuition in the context of decision-making is defined as a “non-sequential information-processing mode”. Over the years managers gain a professional self-confidence for which Matzler, Bailom, and Mooradian (2007) acknowledges that: “Rather, intuition is a highly complex and highly developed form of reasoning that is based on years of experience and learning, and on facts, patterns, concepts, procedures and abstracts stored in one's head”.

For Cholle (2012) there are two different views about intuition. Cholle stressed: “Intuition as immediate apprehension or knowledge was a notion supported by many philosophers from Spinoza to Kant. The more modern type of intuition as immediate insight was arguably present already in the works of the American pragmatists Peirce and James”. This is also one of the reasons that the statement Q418- I feel the necessity of training in the field of decision making does not prove to be significant and why the importance of training in managerial activity is recognized.

Under these conditions, the financial performance of businesses for the reference period is very much to be desired. Nevertheless, trainings are important. “In this context the so-called intuition is not just series of random guesses, but rather a process of combining expertise and know-how with the employee's instincts” (Salas; Rosen; DiazGranados, 2010).

Return of Investment (ROI)

To avoid the influence of other factors, the same statements were also analyzed for financial performance indicator ROI.

Q 418 - I feel the need for training in the field of decision making

Q 419 - Usually I make quick decisions as I consider what is valuable at the moment of decision making

- Q 420 - I always rely on my intuition when making decisions
- Q 423 - Intuitive methods have proved me to be successful in general
- Q 425 - I make decisions independently

The statistical analysis results are as follows:

Table 2: Impact of intuitive methods in ROI

Dependent Variable: ROI
 Method: Least Squares
 Sample: 1 167
 Included observations: 165
 Excluded observations: 2

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	5.524985	3.320066	1.664119	0.0981
Q418	0.923087	0.695860	1.326540	0.1866
Q419	-1.605960	0.623157	-2.577135	0.0109
Q420	1.160768	0.679308	1.708749	0.0894
Q423	0.451930	0.644392	0.701328	0.4841
Q425	-1.221558	0.582961	-2.095438	0.0377
R-squared	0.092917	Mean dependent var		5.773503
Adjusted R-squared	0.064393	S.D. dependent var		7.577834
S.E. of regression	7.329797	Akaike info criterion		6.857459
Sum squared resid	8542.421	Schwarz criterion		6.970402
Log likelihood	-559.7403	F-statistic		3.257437
Durbin-Watson stat	1.725305	Prob(F-statistic)		0.007916

The table shows that the two statements Q419 (Usually I make quick decisions because I consider what is valuable at the moment of decision making) and Q425 (I make decisions independently) are very significant and Q420 (I always rely on my intuition when making decisions) are of moderate importance. The relationship between the ROI and the variable factors is given by the relation:

$$y = 5.524985 - 1.605960 \cdot x_1 + 1.160768 \cdot x_2 - 1.221558 \cdot x_3$$

where:

y – financial performance indicator ROI

x₁ - Usually I make quick decisions because I consider what is valuable at the moment of decision making

x₂ - I always rely on my intuition when making decisions

x₃ - I make decisions independently

Analyzed separately and all of the above statements together demonstrate the fact that for business managers decision-making is a routine process. Frequently, pretend that intuitive decision making is a mental process. This is not enough as according to Kallet (2014): “Thinking is the foundation of everything we do. Every action, every solution, and every decision we make is the result of thinking”. This has led managers in the decision-making process to be guided by intuitive methods but based on Dane and Pratt (2007): “Intuition has long been viewed as involving a form of information processing that differs from rational, or analytical, processes”. According to, Dörfler and Ackermann (2012) “Hodgkinson et al (2008:1) suggest that ‘intuition lies at the heart of a number of dual-process theories of

cognition'. There are many variants of the dual-process theories, each with slightly different versions of duality. The roots of this duality can be traced back to Socrates, Plato and Aristotle in the western world; the first well-known one from the modern era is Freud's (1900) distinction of primary and secondary mental". Intuitive methods based on the manager's personal experience. Matzler, Bailom and Mooradian (2007) highlighted: "The more extensive a decision maker's experience, the more patterns he or she will be familiar with; the more patterns, the better the intuition". This means that intuitive methods of decision-making are dominant for managers in the countries of the region, as the choice of method to be used in decision-making is genuine managerial commitment. For this Baker et al (2001) state that: "decision-making should start with the identification of the decision maker (s) and stakeholder (s) in the decision, ..."

Currently, decision-making still lacks the necessary care to improve it by using more analytical methods as an important step for successful business performance.

b. Financial performance analysis of the analyzed businesses.

The financial performance analyzed has considered two of the financial performance indicators.

LRATIO

This situation has affected the financial performance of the analyzed businesses. Referring to this indicator, it results that 18.18% of businesses in Albania (Tirana), Northern Macedonia (Skopje) 29.73% and Montenegro (Podgorica) only 3.8% result in satisfactory and optimal financial performance. While in Albania 81.82% of businesses, in Northern Macedonia 70.27% and in Montenegro 96.2% of total businesses are at imbalanced financial performance levels and to be kept under control.

Return of Investment (ROI)

Considering the return ratio (inventory turnover) analyzed at the average industry level results as presented below:

Albania, on average has a return ratio of 7.53 times. About 68% of the businesses perform in a return ratio that stands over the average industry report. Around 5.2 % of the businesses have a return ratio of less than 1 times. So, these businesses have a poor financial performance. While 26% of business have a performed lower in the return ratio compared to the industry average.

In Northern Macedonia the financial business performance considering this indicator appears even weaker. Around that 45.9 of the businesses have a non promising performance as their return ratio is lower than industry average. In this group are also including 5.4% of the businesses having a low return ratio, less than 1 times.

Montenegro businesses are characterized by a relatively acceptable performance. There are not businesses to be under to return ratio of less than 1 time. While, 45.3 % of the businesses have their return ratio lower than the average, amounting to 3.9 times.

As above we can conclude that businesses keep more inventories in stock. The excess inventory is certainly unproductive.

Surveying questions to managers in the field shows that managers claim to use analytical methods in decision making. In this context, when discussing analytical methods in decision-making, one has to consider the fact that analytical methods are often claimed to refer to simple "paper-pencil" refinements (Carlson and Shuster, 2018) that managers do their activity. This action does not constitute sufficient condition to be called analytical method for the fact of processing of this nature. Simple refinements generally consider the manager's experience and are based on this. They are "manual" type of decision making methods, which are simple

methods of calculating analysis that refer to the decision maker. These methods do not provide the necessary argument regarding the decision. Whereas analytical methods are characterized by the use of specialized analytical techniques, which are carried out based on a mathematical or econometric model. They generally require the use of certain specific equipment or tools. The use of analytical methods also requires professional preparation by managers.

Conclusion

The above analysis leads us to some conclusions:

- Dominant methods in decision making are intuitive methods and a slight advancement of these methods are those of the type “paper-pencil”.

- Financial performance in the analyzed indicators evidences a non-optimistic reality.

Most businesses are at imbalanced financial performance levels and need to be kept under control with reference to LRATIO indicators.

Businesses also keep stock of most of the inventory items. It represents an investment having a zero-return rate. Also, businesses are holding up stock that jeopardize their operations.

- Academic institutions and the Chamber of Commerce should organize training with managers in both directions. Initially in terms of managers' awareness of the important role of analytical methods in the quality of decision making. In a second phase, training should be provided to managers on the use of analytical methods in decision making. This is because:

Analytical methods compared to intuitive ones ensure success. They are derived from scientific studies and provide fast, accurate and reliable solutions.

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The poster: the learning educational tool for teaching in the immediate environment

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Abstract

This research focuses on the use of the academic poster as an educational tool for learning scientific concepts present in the nearby environment and for their use in the professional future. It is a descriptive non experimental research with a pretest-posttest trial, an ad-hoc questionnaire and a Cronbach alpha above 0.7. The data producing sample was the second year group of early childhood education. In the analysis, non-parametric tests were used for a sample, hypothesis contrast and correlation between two variables. For all the variables that were analysed, the null hypothesis of equal probabilities is dismissed. Twenty-one pairs of correlations are found. The most significant ones are the acceptance of the poster and interest of the poster with the contribution of the poster in the achievement of the expectations. This is due to the motivation and interest that it creates in the students and how these factors contribute to learning scientific concepts. Among other implications of this research, the following stand out: the active methodologies where the student is the main actor in the learning contribute to a higher performance, because motivation is high according to the data given by the students and with high degrees of interest and acceptance.

Keywords: poster, active methodology, natural sciences, immediate environment.

Main Conference Topic: Education, Teaching and Learning

Introduction

This research tries to satisfy the very teaching practice through which it is intended to get better results not only in epistemological knowledge, but also methodological ones of the students in early childhood education Master's degree. The complexity of university teaching activity in the framework of the Bologna Plan must consider a more active implication and participation in the teaching and learning process of the student. This is how, from the teaching experience and the concerns regarding student learning, the question which opens this investigation arises: how to improve the learning of theoretical concepts in natural sciences while students get closer to their immediate environment.

Knowing the immediate environment is one of the areas in the curriculum in the early childhood stage (M.E.C., 2007; M.E.C., 2008). How to bring it closer to the students of infant education in the subject Teaching Natural Sciences was one of the concerns during the first courses as a teacher, in order to achieve educating them in the immediate environment and to feel able to teach it in infant education stage related to everything that has to do with natural sciences. That is why, the adaptation of the academic poster is considered as a tool through which the earlier mentioned objectives can be achieved.

It was done by preparing several activities where the student had to make a poster that could be considered an environment (university, home, neighbourhood) and explain a scientific concept of biology, chemistry, physics or geology. The posters were then showed to the rest of

the work groups and explained. They had to be able to define the concept with their own words, in a clear, concrete and concise way. The session ended with an evaluation by all the other groups, using a rubric prepared for such purpose, as well as the comprehension of the scientific concepts chosen on their poster.

The objectives of this research are: (a) to contrast the relation between variables for the use of the poster in the university academic field; and (b) *to establish improvements for the use of the poster as a teaching tool from the point of view of the student*

Theoretical framework.

The poster or mural is a tool used in formal environments to deal with special and specific topics of scientific nature with the objective of promoting the better understanding of a topic to an audience with different guidelines or approaches (Fabre, 2004). In the formal environment, it is called academic or scientific poster which represents in a graphical and textual way the scientific work. It is considered a proper way of conveying and transferring scientific knowledge (Arslam, et al., 2014), where two clear aspects overlap: a passive one, where the poster is the physical element that is exposed to all participants in a conference; and an active one, determined by the interaction and dialogue constituted between the researcher and the fellows who attend the explanations (De la Cruz, et al., 2016).

This idea of transferring knowledge implies having gained it previously. That is why this tool is used in different formative stages as a means of learning for the student (Reyes & Llanos, 2001). It is used to improve the curricular contents considering a more active participation on behalf of the students and achieving more intense formative experiences such as the transferring of concepts. The students are responsible of the knowledge acquisition since secondary school (Coskun & Eker, 2018), up to postdoctoral students (Lynch, 2018).

The factors to be considered for a correct elaboration of the posters are: the design, the size and font, the columns and rows, and the graphics and images (González de Dios, et al., 2013; Tomita, 2017). It should be added: tools through which to elaborate the poster, the digital format being more present with programmes such as PowerPoint or similar; the main content is should include; the models each conference provides; and, electronic posters with videos and animations (Gundogan, et al., 2016). There are studies about the latter one which stress the positive aspects such as encouraging participation of professionals in the distance, offering the opportunity to interact with researchers who are far apart (Arufe, et al., 2016), or using it in the very conference with screens (Guardiola, 2010). They are more and more present in conferences for being cheaper than traditional ones and for the possibility of being part of the electronic repository of service to any researcher (Ros, 2019).

Also, it stresses the relative issues of a presentation and the evaluation process that follows, or should follow, a poster in conferences and scientific gatherings. Recommendations for presenting them are given, adding possible questions to oral presentations. The evaluation process includes the scientific organising committee that accepts it, and the fellows who listen (De la Cruz, et al., 2016), although it is considered that there are few evaluative tools (Watkins, et al., 2006).

As all tools, it has advantages and disadvantages when it comes to use. In the case of the poster (Guardiola, 2010), the advantages that are mentioned most are: the possibility of reading it at any time during the conference, establishing direct contact with the authors, a better comprehension when viewing graphical representations. The disadvantages are: discomfort to see the poster and having to get close to it, located in separate rooms or that have a difficult

access, schedules for the presentation of the posters overlap other situations of the routine of the participants. All these disadvantages could be avoided if the organisation takes them into account. To elaborate a poster it is recommended that: other posters are not copied, although they could add knowledge, stressing clearly the messages that are to be transmitted considering the audience, and, lastly, conceptualising the design of the poster, hearing the comments with a positive attitude in order to improve in the future (Sousa & Clark, 2019).

Methodology

The methodology that is used is empirical-analytical, being a descriptive research with a non experimental focus. The chosen group is trained, the information has been registered at the end of the event and, therefore, produced phenomena were selected (Latorre, et al., 2005). The correlations between variables were examined (Bartolomé, 1984).

Procedure

During the first weeks, a questionnaire was handed in order to know the particular aspects of the students and their relation with natural sciences. In the last interactive session, to which the attendance was compulsory, students were handed the final questionnaire regarding the activities that were carried out and the relation with natural sciences at the end of the academic year. In both cases, the questionnaire was a paper document that submitted once filled in. The data was introduced manually. A pseudonym was given for both questionnaires, being required to use the same one so that the information could be grouped by student.

Participants

The participants were group A from the subject Teaching Natural Sciences in second year students of early childhood education during the academic year 2018-2019 in the University of Coruña. It was a deliberate and judgement sampling in which the participants are determine by the whole study group (Ruiz, 2003). The sampling was constituted by students in attending mode, a total of 62, and the data producing sample of 43. They answered both questionnaires, although only 59 answered the first one.

Tools

Two types of tools were developed: a pre-test one and a post-test one. The pre-test consisted of 12 items divided in three sections: the characteristics of the student, the expectations from the course and the previous knowledge in natural sciences with a Chronbach alpha of 0.768. The post-test questionnaire consisted of 12 items divided in two sections: one of general achievements of the course and another one focused on the poster made and a Cronbach of 0.812.

Analysis methods

The software used for the analysis of the quantitative data is the SPSS-22. The frequency statistics analysis was used of each item. Then different non-parametric tests were carried out, according to the characteristics of the variables. Lastly, the contrast hypothesis and the correlation between elements. After the correlations, the range of sign for paired samples was analysed. (Abad & Vargas, 2002).

Results

64.4% of the students have a bachelor's degree; more than a third, 33.9% studied training cycles; and only 1.7% have higher education. 61% of the students is 20 years old or less; 34% is between 20-25 years old; and 5.1% are older than 25 years old. The average is 20.83 years old and the standard deviation is 2.53. More than 5.1% of the students have not studied natural

sciences in the past ten years, the majority have not studied sciences for 5 years, and the average is 4.56 years and the standard deviation 2.41. 96.6% of the students is in full-time attendance and 71.1% are not working.

The acceptance level of the poster is a range of minimum 1 and maximum 5, 72.1% choosing level 4 or 5 and no students choosing the minimum. The interest level is a 79.1% with a level 4 or 5. 76.7% of the students consider the poster contributed on a 4 or 5 level to the achievement of the expectations set on the subject. The most difficult part in the elaboration of the poster was finding the information with a 53.5% followed by the synthesis and adaptation of the information with a 20.3%; and the most difficult was preparing the poster with a 55.8% followed by the presentation of the poster with a 23.3%.

Table 1: Correlations between variables (data obtained from SPSS-22 analysis).

		Previous title	Years without Natural Sciences	Age	Work	Dedicacion estudios	Grado satisfación CCNN inicial	Final acceptance level	Final motivation level	Poster acceptance level	Poster interest level
Years without Natural Sciences	Cor Pearson	.610**									
	Sign	.000									
	N	59									
Age	Cor Pearson	.780**	.728**								
	Sign	.000	.000								
	N	59	59								
Work	Cor Pearson	-.365**		-.418**							
	Sign	.005		.001							
	N	59		59							
Attendance mode	Cor Pearson	.415*		.311*	-.326*						
	Sign	.001		.017	.012						
	N	59		59	59						
Initial motivation level Natural Sciences	Cor Pearson					.587**					
	Sign					.000					
	N					59					
Initial expectations level Natural Sciences	Cor Pearson					.626**	.766**				
	Sign					.000	.000				
	N					59	59				
Final acceptance level	Cor Pearson			.328*							
	Sign			.032							
	N			43							
Final motivation level	Cor Pearson							.535**			
	Sign							.000			
	N							43			
Achieved expectations	Cor Pearson	.334*	.402**	.373*				.423**	.556**		
	Sign	.029	.008	.014				.005	.000		
	N	43	43	43				43	43		
Poster interest level	Cor Pearson									.839**	
	Sign									.000	
	N									43	
Poster contribution to achievement	Cor Pearson									.835**	.913**
	Sign									.000	.000
	N									43	43

The distribution of the variables *years without natural sciences* and *student age* is normal. The contrast hypothesis for a sample is done with non-parametric tests with a level of significance of 0.05 and a confidence interval of 95%. For all the variables that were analysed, the null hypothesis of equal probabilities is rejected. In the quantitative variables, the significant correlations obtained are the ones in table 1. There are 21 pairs of correlations, out of which three are negative.

Using the non-parametric Wilcoxon test for two related samples, the pairs that correlate are contrasted with the one that complements the information of the correlations. It is established in all pairs of variables of the null hypothesis that there are no differences in the medians between both variables. The null hypothesis is rejected for all pairs except for: the level of interest in the poster with contribution to the achievement of expectations; the level of acceptance of the poster with contribution to the achievement of expectations; level of acceptance of the poster with the level of interest in the poster; years without natural sciences with the achievement of expectations from the subject; level of acceptance obtained with the achievement of expectations from the subject; level of acceptance achieved with the level of motivation from the subject; and, initial degree of satisfaction with natural sciences with the level of expectations of the initial subject.

To the question related to the interest in natural sciences, the students answer: first, biology and specific topics of this subject such as anatomy, human body, environment, ecology representing 40%; second, physics and astronomy representing 25%; third, chemistry representing 20%; fourth, geology representing 6%. Regarding the question *what do you expect from the subject*, 30% of the students want to gain knowledge; 30% want to learn to apply or adapt natural sciences to early childhood education. Another set of answers is the one that want to learn to teach natural sciences representing 21%; and, the ones who mention improving methodologies, resources, materials, creating environments and everything related to teaching, representing 9%. Lastly, the group who wants to experiment and discover representing 6% and another group who expect the subject to be interesting representing 4%. At the end of the second questionnaire, post-test, they were asked for proposals to improve the poster they had made. 52% considered that everything was perfect the way it was. 34% mention organisational aspects of the activity such as spending more time in class, more tutorials, a higher percentage of final tests, introducing the activity earlier, more open topics or help with the search of information. 7% of the answers include a need for different teaching formats including theatre.

Discussion

Two goals were set. The first one, *to contrast the relation between variables for the use of the poster at an academic level*, it is achieved due to the correlations established from the obtained results. It is worth noting that there are no significant correlations between the initial inputs of the results, pre-test, and the final results, post-test; but there is a certain connection between the correlations. The most significant correlations are the acceptance and the interest in the poster with the contribution of the poster to the achievement of expectations. Motivation and interest contribute to the acquisition of scientific concepts and, therefore, to the achievement of the expectations from the subject (Castañón, et al., 2017). It is important to highlight (table 1) that higher achievements are accompanied by higher acceptance and motivation and with previous university degrees. It is this final motivation that correlates with the initial expectations (López, 2017). High levels of motivation and interest for each of the activities with active methodologies possibly contribute to achieving expectations such as gaining knowledge and learning to apply natural sciences to the early childhood education stage and, at the same time, increasing student academic achievement.

The second goal, *establishing improvements for the use of the poster as a teaching tool from the point of view of the student*, is achieved by determining that the more complex aspects of the poster design are found in the search of information and is followed up by adapting the language of the fellow students.

The teaching transposition contributes to transforming the scientific knowledge to knowledge susceptible to being understood by the interlocutor (Chevallard, 1991). For that reason, it must

be examined, beyond the 52% who think nothing can be improved, and deepen in answers related to the organisational process of elaboration such as: first, more tutorials, although they knew about the possibility of doing as many as needed; more time in class for the working team and help with the search of information for which it would be necessary to insist on the tutorials hours, and organising the timeline to contribute in the guided team work and supervised by the teacher (Aguilar, 2015). It is possible that by increasing communicational elements those aspects related to the organisation of the activity could be minimised. Also, it would be necessary to add team work as the main aim during teaching hours.

The implications of this research are: (1) active methodologies contribute to a higher performance, because motivation and with a higher level of interest and acceptance (Dulsat, 2019; Ramos, et al., 2019). These active methodologies require group work in most cases, and most of the students do now know the group work strategies and working in groups must be emphasised by joining the groups during the sessions in order to guide them through the process of elaborating an activity (Guerra, et al., 2019). It must also be added that, sometimes, the academic poster is a learning tool that becomes a simple poster of images that lacks any explanation: image and text are important in the poster and must be present. To these two elements, we must add the oral communication of the poster, the explanation of what is represented in the document (D'Angelo, 2018). New technologies are more and more relevant and their use in all environments, including in the academic one, the university, and in teaching and learning processes. The electronic poster which includes videos, or video posters, are an evolution of the transferring of knowledge (Kemczinski, et al., 2017).

The limitations found in this research are found in the data producing sample. It is a descriptive investigation that analyses a befallen phenomena . It approaches the viability of the academic poster as a teaching resource. This research is oriented towards subsequent studies related to the topic, as well as improving the teaching practice and the activity of the poster. Another limitation is found in the tools used because the ad-hoc questionnaires have deficiencies that the research will correct in future extensive studies.

Future proposals are directed towards the research and the activity itself. Regarding the research, broadening the sample and standardising the tools are elements to be considered. As for the activity, future proposals would be dedicating sessions that contribute to the general understanding of group work and encouraging in the adaptation stage of scientific knowledge of language as a first contact to adapting the scientific language to that of the future students of early childhood education. There is the possibility of extending technological resources through which it could be possible to design the poster by introducing video.

In conclusion, it can be said that the use of the academic poster as a teaching tool has contributed to the acquisition of knowledge for teaching natural sciences; it has been one more element of motivation and academic performance improvement of the students; it has brought natural sciences closer to students who had been out of touch with it for a long time; and, the poster has contributed to the presentation of methodologies that can be useful in their professional future.

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Do You Know What Your Management Model is?

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Abstract

This article aims to investigate which are the main pillars of the management model and how the management model has changed in order to face this new VUCA (Volatile, Uncertain, Complex, Ambiguous) World. Our proposal integrates many of the latest best scientific and robust approaches on the theme with a practical research study conducted on 200 CEOs of multinational companies across a broad range of industries. Thus, the findings of this research study is a framework for both academia and management, which fills the gaps identified in existing knowledge. In particular, this research study contributes to knowledge by: 1) providing and explaining which are the main pillars of the management model; 2) providing a new management model's framework able to deal with the new business challenges; 3) providing four possible archetypes of management model in order to help managers to identify their own management model.

Keywords: management model; management innovation; engagement; people management, organisational behaviour.

Main Conference Topic: Leadership, People Management, Management Model

Introduction

The business world is in a constant state of flux. A new generation of employees, technologies and the digital revolution are all factors that contribute to what is called the iper-competitive VUCA world (volatile, uncertain, complex and ambiguous) (Bennett & Lemoine, 2014).

These increasingly digital and iper-competitive markets, and the ability to work with five different employees generations oblige organisations to face unprecedented challenges in the way they manage people. The psychological contract is now different from what it once was, and there is clear evidence that employee expectations are quite different from those of the past.

However, to the detriment of this new managerial revolution, as shown by our research, even today more than 50% of companies use management models that refer to the times of Taylor and Ford. In fact, around 100 years ago, Henry Ford, Frederick Taylor, Henri Fayol and Frank and Lilian Gilbreth developed structures, processes, hierarchies and control systems that are still used today. These systems and structures were fundamentally oriented towards efficiency, reduction of production costs and product standardisation. This model of industrial management, called Management 1.0 speaks about total respect for hierarchy, chain of command, subordinates, and rewards and punishments (Birkinshaw, Healey, Suddaby & Webber, 2014; Druker, 2004; Mintzberg, 2009-2013). A manager in this industrial era did not have to pay much attention to what he was producing or to the people who were producing it. His or her job was to follow orders, organize the work, coordinate the results, and ensure that the job got done as ordered. The focus was exclusively on the business model.

In this new iper-competitive world, one of the few sources of sustainable competitive advantage, as many commentators have recently suggested, is to continually develop and engage people in the development of the organization (Sutton, 2009; Gratton, 2011). In order to obtain a sustainable competitive advantage, it is not enough for companies to work on their business model alone (Covey, 2004). Research over the past decades has shown that the problem with the management model is that the conventional hierarchical approach based on a command and control system is no longer a credible option for an unpredictable and rapidly changing global business environment (Hamel, 2012; Kotter, 2013; Vlatka, 2014). The emergent management model has to bring more innovation and engagement throughout the distribution of formal power and decision-making interaction, thanks to informal networks, experimentation and learning processes (Anthony, Johnson, Sinfield & Altman, 2008). These statements are grounded on the assumption that management is about facilitating and enabling, rather than directing and controlling (Goffee, 2006; Sinek, 2009; Jaques, 2017).

A stream of research with its intellectual origins in the 2000s in the work of Fons Trompenaars and Ed Voerman stressed the fact that effective managers in this new world must be masters of paradox – they have to understand the need to operate on the whole business system. This expression could sound strange. Why talk about the whole business system instead of simply business system? The business system is composed of a hard part, the business model, and a soft part, the management model. It is evident how worthless it would be to work exclusively on only one of the parts, while ignoring the other. Most managers invest time and energy in inventing and implementing business models, forgetting the other side of the coin, the management model (Hamel, 2009). What is clear from prior research is that there is a lot of confusion about what a management model is and what the main elements that compose it are (Birkinshaw, 2010). While a business model is the way in which a company develops its own business and achieves value for its clients, shareholders, staff and partners (suppliers and distribution channels), a management model has to clearly specify the main principles around which a company establishes its behavior and, consequently, the main managerial choices concerning how to manage its people. It is immediately clear that investing time and energy in defining the management model is a matter of fundamental importance, since competitive advantage not only comes from a good business model, but also from a valid management one. A business model without a management model is a failure; a management model without a business model is pure theory (Gratton & Ghoshal, 2005). To be able to survive the test of time, managers must learn to work on both the business and management models simultaneously.

In particular, the purpose of this paper is that to investigate which are the main elements that constitute the management model, how these elements are changed in order help people to work at their best and to identify some possible management models' archetypes. Our proposal integrates many of latest best scientific and robust approaches on the topic with a practical research study conducted on 200 CEOs of multinational companies across a broad range of industries.

This paper is organized as follows: after this brief introduction underlying the main goals of the work, section 2 conducts a deep bibliographical analysis. Section 3 described the adopted methodology and give reasons about the choice. The results of the interviews are reported in section 4. Section 5 contains conclusions.

Literature Review

Many leading management thinkers and professionals such as Kotter (2001), Birkinshaw (2010), Hamel (2012), Vlatka (2015), have recognised the need for a management shift in the way managers manage people.

But unfortunately while business innovation is a daily matter for managers, management innovation receives less attention. As Gary Hamel, Julian Birkinshaw and Michael J. Mol (2008) say, management innovation is the invention and implementation of a management practice, process, structure, or technique that is new to the state of the art and is intended to further the organizational goal. Since management innovation has the same amount of dignity as business innovation (if not more), then it is of fundamental importance to understand what the elements are that make it up. Few authors have dealt with clearly identifying what the pillars are that make up the management model; to date, the elements of the management model have not yet been clearly identified. In his bestselling book *Reinventing Management*, Julian Birkinshaw (2010) was the first to propose a management model based on four main macro managerial dimensions: coordinating activities, making decisions, defining objectives and motivating people. For each of these four dimensions, Birkinshaw identifies the principles of what he calls the “traditional principles” and the “alternative principles”, as show in Figure 1.

For the element Coordinating Activities, the root philosophy is “less is more”. In fact, most organisations have too much bureaucracy and can usefully rely on fewer formal processes to get work done. The concept of emergence, as used by Birkinshaw, refers to spontaneous coordination through the self-interest behaviors of independent actors. Making Decisions is strictly linked to the concept of hierarchy.

Coordinating Activities	
Bureaucracy	<i>Emergence</i>
Making Decisions	
Hierarchy	<i>Collective Wisdom</i>
Motivating People	
Extrinsic	<i>Intrinsic</i>
Defining Objectives	
Alignment	<i>Obliquity</i>
Traditional Principles	Alternative Principles

Figure 1: A Framework for reinventing management
 Source: Birkinshaw (2010), *Reinventing Management* p. 38.

Hierarchy gives managers direct accountability for the decisions they make and it provides them with legitimate authority over their subordinates. Over the past two decades, in a business setting, hierarchy ends up being a multi-layered concept with three overlapping elements: position, knowledge and action. Traditionally, all three of these elements were fully aligned. But the reality today is that knowledge is dispersed throughout the company and individuals are often encouraged to take initiative beyond their formal role. The third element is motivating people. A myriad of books and articles vigorously define their version of motivation. An analysis of these definitions, though, reveals that motivation is the internal condition that activates behavior and gives it direction (Druker, 1999-2004). One key insight

that has emerged is the distinction between intrinsic and extrinsic motivation. Intrinsic motivation comes from the rewards inherent to a task or activity itself. Extrinsic motivation comes from outside the person, with money being the most obvious example. The new management model is geared more towards intrinsic motivation coming from the quality of work and involvement (Goffee & Jones, 2006; Kotter, 2013).

The last element, Defining Objectives, is related to the company's objectives and the principle of alignment. Alignment is the adjustment of an objective in relation to other objectives. In the business context, this means that all employees are working toward the same common objective. Birkinshaw points out that companies have at least five problems with the principle of alignment: individuals in companies often have different agendas, measures and incentives are blunt instruments, short-term targets drive out long-term objectives, shareholder demands are satisfied at the expense of other stakeholders and many employees in many companies do not really know where they are or should be going. So far, Birkinshaw's research has pointed out that we have to explore the potential of obliquity as an alternative principle and presented three different approaches to obliquity that firms have used: pursuing an indirect goal, pursuing a creative goal and taking a leap of faith.

Murphy (1995) in his Chapter Generative Coaching: A surprising Learning Odyssey inside the book Learning Organizations at pag. 197 says: "Looking back, it amazes me how foolish this now look. Managing people is a guarantee that one will never create a learning organization! Even now, most managers don't yet understand how manipulative most human resource approaches are and how such approaches invisibly undermine their very purpose: excellent performance. Such systems must be replaced if what is wanted is to create non-manipulative, high performance, high quality learning organizations. Among the changes needed is to move from managing people to coaching them".

Also Hamel (2009), one of the most credible management thinker underline that management is a mature technology that must now be reinvented for a new age, where organizations must become a lot more innovative, agile, and inspiring without getting any less focused, disciplined, or performance oriented.

As Vlatka (2015) says, managers have to change the way they manage people. The main problem is that the conventional hierarchical approach based on a command and control system, is no longer a credible option for this and the following years. Conventional management approaches have been based on the Newtonian model which is mainly focused on hierarchical linearity, on a cultural system based on rules, strict command and control principles and formal relationship. In this Management 1.0 era people are asked to execute orders. The emergent management model has to bring more freedom and engagement throughout the distribution of formal power and decision-making interaction thanks to informal networks, experimentation and learning processes. These statements ground on the assumption that management is about facilitating and enabling rather than directing and controlling.

Method

Concerning the adopted research method, we have combined the contributions of the most robust publications on the theme with our research, which has been principally focused on identifying which are the main pillars that constitute the management model, how the management model is evolved in order to face the new management challenges and if it is possible to identify some management archetypes in order to help managers to identify the management model of their organizations.

Making use of the technique of open-ended interviews, we attempted to refuse or confirm the results of our previous researches on the topic (D'Amato and Macchi, 2017 - 2019).

Table 1: Sample description

Our previous researches lead us to identify six main elements of a possible management

Gender of the respondents		Age of the respondents	
Male	80%	29-40	18%
Female	20%	41-50	62%
		Over 51	20%

Industry of the company		Dimension of the company (n° of employees)	
Automotive	8%	From 0 to 50	10%
Banking/assurance	10%	From 51 to 200	16%
Consulting	6%	From 201 to 400	23%
Pharmaceutical	7%	From 401 to 600	20%
Large Retailers	4%	Over 601	31%
Mechanical Industry	22%	Annual turnover (million Euro)	
Services	20%	Up to 50	15%
Textile/clothing	10%	From 51 to 200	35%
Transports and Communications	7%	From 201 to 500	23%
Others	6%	From 501 to 1000	15%
		Over 1000	12%

model: control, motivation, objectives, decisions, information and learning.

As anticipated, in order to understand whether the interviewees confirmed the management model's pillars, we have decided to run a qualitative study conducted over the last 3 years by our research group, carried out using open-ended interviews on a large sample of 200 CEOs from multinational companies in more than 10 countries, across a broad range of industries and of different sizes, both in terms of revenue (from €10,000,000 to €3,000,000,000) and in terms of staff (from 50 people to 10,000 people).

All the interviews were collected between November 2016 and November 2019, lasted about 60 minutes each and were taped and transcribed. About 20% of the interviews were made on-line. The responses have been integrated with information on HR practices.

Findings

The current research, contrary to the two previous researches (D'Amato & Macchi, 2017-2019), has led us to identify not six but eight dimensions that make up the management model: making decisions, controlling activities, defining objectives, engaging people, sharing information, organizational learning and the two new ones creating culture, creating the right environment. This new research also helped us in identifying four archetypes of the management model.

In fact, almost all the interviewees, more than the 88%, recognized that these eight elements are fundamental for an effective and modern people strategy.

We do not intend to discuss here the first six elements that have already been studied in depth in our previous researches (D’Amato & Macchi, 2017-2019), but only the two new ones that emerged from this research: creating a culture and creating the right environment.

Management model’s dimensions	Traditional management model	Alternative management model
MAKING DECISIONS	Top down approach Strong bureaucracy	<i>Bottom up approach</i> <i>Shared responsibility</i>
CONTROLLING ACTIVITIES	In the hands of the bosses To control people’s work	<i>Self-directed team</i> <i>To help people to work better</i>
DEFINING OBJECTIVES	Top down approach (SMART) Short term approach	<i>Bottom up approach (SMARTIE)</i> <i>Medium/long term approach</i>
ENGAGING PEOPLE	Extrinsic based on rewards Mass motivation	<i>Intrinsic based on involvement and job quality</i> <i>One to one approach</i>
SHARING INFORMATION	Confidentiality Reserved to few people	<i>Openness</i> <i>Available to all the stakeholders</i>
ORGANIZATIONAL LEARNING	Knowledge is power Left to individuals	<i>Shared Knowledge</i> <i>Planned by the company</i>
CREATING CULTURE	Competitive Paternalism	<i>Collaborative</i> <i>Meritocracy</i>
CREATING THE RIGHT ENVIRONMENT	Constrain Compliance	<i>Trust</i> <i>Discipline</i>

Table 2: New Management Model Dimensions
Source: Authors' results

Creating Culture

When we talk about culture, we refer to the set of common beliefs, values, stories, rites and myths, as well as the language that creates a common identity and a sense of community. Culture is therefore a sort of "social glue" that holds together all those belonging to an organization. A glue whose composition is complex and whose manufacture is a slow and constant process. Culture is produced day after day, even unconsciously, by all the people who work together. It is a precise responsibility of the leaders to define and develop the desired culture by clearly defining what the values and behaviors associated with them are.

An interesting testimony is what a CEO interviewee says: “In our case, values have always mattered a lot in the choice of people, maybe because of our entrepreneurial origin, which contributes to maintaining the central role of these elements in company life. Moreover, values have been handed down over the years with great perseverance. And it’s not a coincidence that our company’s choices are still guided today by the values of the company founders.”

The secondary strengthening mechanisms are tied to defining organizational structures, systems, and procedures. This includes how space is designed (open space, rec rooms, size and number of meeting rooms, etc.), rites and rituals (from the Christmas party to other holidays, how new employees are welcomed or bid farewell as they retire), and how the company formally declares its mission, vision and values.

Below is an example of corporate culture applied to the people selection methods of an international automotive company: “We almost exclusively hire recent graduates. Right or

wrong, this is our choice. I have no interest in taking on know-how I don't have. I prefer creating it through fresh minds. If we hadn't done it like this, we wouldn't have created the simulator, we wouldn't have done many other things. Something essential, maybe even the most essential thing, is passion for this kind of job. It is necessary to have a strong methodology in order to learn, so I choose candidates depending on the university or school they attended, because some are stronger than others in terms of teaching methods. So, this is also a way of selecting."

But is one particular culture better than another? Actually, no. We can find ourselves, and it is inevitable, more in tune with one culture than another, but the worth of a culture depends only on how tacit assumptions create a type of strategy and organization that is functional to the environment in which the organization works. Therefore, only long-term results can tell us if a culture and its evolution have actually been "successful".

Creating the Right Work Environment

By work environment, we mean everything that forms part of employee involvement with the work itself, such as the relationship with co-workers and supervisors, organizational culture, room for personal development, etc. A positive work environment makes employees feel good about coming to work, and this provides the motivation to sustain them throughout the day. Gratton and Ghoshal (2005) has identified four elements that represent, what he called the smells in organization: constraint versus stretch; compliance versus discipline; control versus support and contract versus trust.

In our research, we used the above-mentioned 'smells'. We discussed the different smells we recognized in organizations.

As a CEO explains: "There is no doubt that feeling good in the work environment helps to generate ideas: it's easy to imagine that if we put a creative person inside a black cube, however good they may be, they don't have much chance of finding stimuli to generate brilliant ideas. At the same time, a calm and positive environment helps to increase the motivation of people living inside it. No wonder innovation legends such as Google and Facebook have built their headquarters with this logic in mind. The working environment must reflect the path the company wants to take: a squalid or run-down office, in terms of furniture or atmosphere, surely doesn't predispose the research of fascinating products."

Having interviewed 200 CEOs, we are also in a unique position to assess that it is also possible to classify the management model into four archetypes: Hierarchical, Planning, Innovating, Self-Organizing. The labels we have attached to each model are fairly evocative of their character.

Hierarchical Model

Decisions are made by few people (usually the owners), information is scarce, and people often do not know key business information (turnover, profit, cost, market share). The function of coordination and control are in the hands of just a few members, either the owners themselves, or the people they trust. The extrinsic motivation is solely based on the «logic of the seal»: whoever does the right «trick» gets a prize. The objectives are mainly based on short-term goals and are almost exclusively focused on providing benefits to shareholders. The orientation of the people in the hierarchical model is the "doing".

The hierarchical model is the classic model for most small companies. In our sample, 50% of the small companies, 20% of medium companies and 10% of the big companies, regardless of their industry, use this model.

Planning Model

Decisions in the planning model, even those that are strategically unimportant, are still made by few people, but there is more freedom in how to carry out the work. The information is still scarce, but people have greater freedom to find it: the concept is that of «He who seeks, shall find». The functions of coordination and control are beginning to be delegated to the front lines. Motivation is mainly extrinsic, based on rewards and incentives, even if you are starting to push people to think about what they do and not just «doing». The goals are still primarily focused on the short-term, even if you do see glimmers of interest from other stakeholders, and not just from your shareholders. The orientation of the people in the planning model is still that of «doing», but with some opportunity for reflection that leads to a culture of continuous improvement.

The planning model generally constitutes a transition model between the Hierarchical Model and the Innovating Model. We can say this because in the course of numerous interviews (about 50), it emerged that the Planning Model generally constitutes the springboard for the Innovating Model. This management model archetype includes 20% of the small companies, 30% of medium companies and 40% of big companies, regardless of the industry they work in.

Innovating Model

In this management model archetype, only strategically important decisions are in the hands of the top management, and everyone is free to decide within their own responsibility and role. The information circulates freely, so you do not have to seek it out. People are informed about the essential facts and business/financial data. They perform the function of coordination and control independently, but under the supervision of the hierarchical bosses. Motivation is both extrinsic (rewards, bonuses, incentives) and intrinsic, based on the possibility of autonomy in carrying out their work. The goals are both short and medium-term, and encompass a broader vision of the organisation that includes all stakeholders. In the innovating model, the culture is both that of «doing» and reflecting. People are focused on continuous improvement and change.

The figures for the companies from our survey that use this model are 20%, 30% and 35%, respectively for small, medium and big companies, regardless of their industry.

Self-Organizing Model

Competence and collaboration prevail in the self-organizing model. Decisions involve all the players who can contribute qualitatively with their expertise to the making of decisions, irrespective of the role they occupy. Information flows freely and is readily available. The business model and the organisational structure is constantly challenged in order to find the best strategy/structure compromise. Motivation is primarily intrinsic (quality of work, cooperation between people, the constant search for challenge, opportunity to participate in profit sharing). The objectives are short to medium-term and take into account all stakeholders. The culture in this Management Archetype is that of innovation and continuous experimentation aimed at finding a sustainable competitive advantage over time.

In this Archetype fall the 10% small companies, and about the 20% of the medium companies and about the 15% of the big companies, of our sample. Differently from the other archetypes in this case almost all the companies belong to the consulting and pharmaceutical industries. This is due to the fact that continuous change and innovation are key facts for their survival.

Conclusion

Managers are still unclear what is meant by a management model and what are the elements that make it up.

However, emerging frameworks can assist managers in cutting to the essentials. The research results presented in this article clearly highlight what the eight essential elements are that make up the management model: the nature of the targets that the company wants to pursue, how people are motivated to pursue those defined targets, how the company's activities are organized and coordinated, how decisions are made, how information and numbers are managed, the kind of culture that is set up, and the type of work environment created. As previously mentioned, current company's needs and challenges are very different from those of ten years ago. Our research attested that a continuous evolution and improvement of the eight dimensions of the management model is mandatory for companies that are determined to maintain their competitive advantage. Decisional processes cannot rely only on hierarchical principles anymore, but instead should be based on new concepts of shared responsibility and shared company knowledge.

Coordination and control must increasingly be delegated to individual people, who, being more schooled and prepared, can assume ever greater responsibilities and ability to manage themselves. Similarly, the definition of objectives bases itself on a double top-down and bottom-up approach.

Moreover, objectives can't be focused exclusively on the short term. We suggest widening the referring time horizon and including greater sensitivity towards environmental and social aims. Motivation is strongly personal and related to individual needs and perceptions: it cannot be influenced only by economic aspects and should therefore be determined by a higher level of both commitment and job quality. Information needs to be shared and transparently communicated within the company. Employees should be provided with all the pieces of information they need to perform their job at their best. It is impossible to have people engaged without sharing the corporate mission, vision and values. Managers are primarily responsible for defining and creating corporate culture, for choosing who gets to be on board and who does not. The working environment is also crucial. There is no doubt that feeling good in the working environment helps to generate ideas and results. It is a specific task of the leaders to work in order to create an environment that allows people to feel good and to reach their full potential. A final mention is due to the learning and growth processes that have to be planned at the organisational level, devoted to all employees and widened to cross-functional competences. This last element is crucial, since organizational learning represents the essential engine for companies to grow and improve continuously. In conclusion, having also identified four possible management model archetypes, managers can now get to know their current management model and decide whether it is the right one to obtain a sustainable competitive advantage over time. Otherwise managers can implement the appropriate strategies on each of the eight elements in order to removal their management model.

As always, the overall performance will have the last word.

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Professionalism of Estonian youth workers: coping with youth social problems and communication in their opinions

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Abstract

Youth work has an important role in the newly created Estonian Education Strategy 2035. The contribution of youth workers in promoting non-formal learning, solving youth social problems, communicating were expectedly very necessary, but its effectiveness was unclear. Research help to explain what were the main challenges for youth workers in the context of social themes. Youth workers' work context, trust, enthusiasm, passion appeared in a qualitative study. In this article three questions were in focus: what were the main communication challenges for youth workers? How they solved social problems? What strategies supported a youth worker in socialization on the context non-formal learning? Data was collected from semi-structured interviews with 18 Estonian youth work specialists. The results showed that youngsters dealt their social problems quite often and it based on the mutual trust. Mostly were mentioned youth low communication and often team-work skills too, or non-appreciation of cooperation. It turned out, that for youth workers socio-psychological approaches and specific hobby-based activities were most important for cope with themes. They must deal with youth behavior and had important influence and were as an example. Confidence, empathy, trust, communication skills, patience and professionalism were the key qualities of work success for interviewees.

Keywords: communication, social problems, youth worker

Main Conference Topic: Education, Teaching, Learning and e-learning

Introduction

Youth worker is an education specialist in the field of non-formal learning. The multifaceted nature of youth work (YW) and the often-changing context of the practical work of youth workers, causes increasing expectations and demands on their professionalism (Veigel, 2018). Youth worker supports the personal development and learning of young people outside the school, family and work (Noorsootöö seadus, 2010), and creates the conditions necessary to achieve it. According to Cooper (2012) the lack of specific theories and modern models of YW often makes it difficult to understand professional meaning and work content. The content of YW has been discussed in order to understand its content and to prioritize its explained impact or activities to be studied accordingly. (Siurala, 2017; Williamson 2017). The strength of YW is that its intimately anchored in practice, based on broad understanding of a human being (cognition, emotion, relationships, the social), understanding knowledge building as collaborative effort (learners as social groups and not individuals) and linking learning to action. During the current times of uncertainty, conflicts and complexities, YW is becoming an educational approach. (Siurala, 2017a). The youth worker has a kind of position in the young person's world, where he or she can be both a leader and a partner, his or her own and a stranger, supportive and neutral, an example and a friend. Working together and communicating directly

builds a foundation of trust and have also opportunity break down the intergenerational barrier. (Jung, 2013).

European Commission (2015) has identified three major challenges to the socialization of young people as active citizens: personal (positive outlook, use of own resources, taking initiative, maintaining autonomy and motivation, shaping one's self-image), relationship-based (having trustworthy people nearby, good relationships with friends and family, ability to create a social network around oneself), social challenges (having access to quality education and training, finding quality management, finding worthy job offers and occupation, finding a place in society, being able to express one's opinion). All this can be achieved in YW: through the development of a sense of respect, opportunities and skills for dialogue, building relationships of trust, maintaining positivity, an individual and flexible approach, valuing volunteering, non-formal learning, unlocking young people's potential and empowering them. Communication with the public and cooperation in the field of YW are the tasks by youth worker occupational standard. Also cooperation with stakeholders outside the field of YW. Ensuring a safe environment, including supporting social development and creating a social environment (Noorsootöötaja Kutsestandard, 2018). According to the Estonian Lifelong Learning Strategy 2020 (2014), it is necessary that youth workers teaching the 21st century skills, including communication.

Youth social problems are on an ever-increasing trend (poverty, unemployment, violence, alcohol, drugs, smoking). The Youth Development Plan 2014–2020 highlighted negative trends in youth, such as increasing emigration, high numbers of young people not in employment or education and unemployment among 15–19-year-olds, high relative poverty rates and worrying health behaviors. Paying attention to these issues requires, in particular, the identification of causes and prevention. However, this is only one classification and young people face very different difficulties and challenges. The problems of many young people are caused by the transition to the adult world, because they are not prepared for it. They also need help coping with everyday life and making career decisions (Trumm & SA Poliitikauuringute Keskus Praxis, 2012). YW activities can support the development of the skills, competences and qualifications required for work among young people, which is one of the national targets for 2020 to reduce social inequalities. Young people's different attitudes towards work, communication skills, sense of duty, etc. are a topic of discussion for employers and educators.

The reputation of the youth centers has gradually changed in Estonia and was increasingly being more evaluated. The relationship created with youth in YW can often be decisive and bottom-up. Youth worker is in various roles very meaningful. The roles of youth workers' are changing quite often, according to needs (Veigel, 2018).

The purpose of this research is to explain what were the main challenges for youth workers in the context of social themes and communication with youth. Youth workers' work context, trust, enthusiasm, passion appeared in a qualitative study. Three questions were in focus: what were the main communication challenges for youth workers? How they solved social problems? What strategies supported a youth worker in socialization on the context non-formal learning?

Theory

Youth Field Development Plan for 2014-2020 (2013) is to create more opportunities for youth to explore their full potential, to increase ways of developing youth creativity, self-initiative, and to develop a concept for smart youth work. The content of YW is the social, cultural and health education of young people, which promotes the mental and physical development of young people. The main activities of YW are information (incl. establishing contact with young people), involvement, increasing the participation of young people and raising the quality of YW. It also includes work with young people at risk, hobby education,

leisure activities, youth counseling and work education, international youth work, etc. (Käger, Kivistik, & Tatar, 2017). In Estonia around 21% of the total population are young people.

The focus on social issues in YW is due to society, including changes in the lives of young people - rising unemployment, general poverty, dropping out or changing education - and a generally non-linear and ever-changing life cycle. (Kasearu & Trumm, 2013) Young person's immediate environment is mainly considered to be those, in which he or she spent most of his or her time. For young people, these environments are school and home. Given the fact that the youth center is one of the school and out-of-home environments where young people spend their time, the youth center can also be considered as one of the young people's immediate environments. U. Bronfenbrenner's theory of the social ecosystem, which examines the mutual adaptation of an active young person and his or her changing living conditions, influencing the inclusion of youth centers in the immediate environment, is influenced by the relationships between different environments and relationships in the wider societal context. (Bronfenbrenner, 1979). According to the theory, Bronfenbrenner depicts the ecological environment as a set of four interconnected systems and as an interaction between human personality, processes, context and time. The first level, or micro level, is the home, which includes parents, grandparents, etc. Young people are strongly affected from this level at an early age. Based on this, the environment of the youth center is closest to the level that is related to the school environment, but through non-formal learning.

Communication and relationship-related are important, and in various studies they have also been considered the most important skills by Estonian youth workers in their work. Social thinking, social relations, social influencers - all of these are handled by a youth worker and should be coped as expected. There is often talk of contributing to young people's social capital and supporting the development of communication skills. Social capital in the context of an individual's relationship networks, helps to cope better in different situations. Social skills help to build rewarding relationships and prevent negative treatment by others. Juusola (2011) writes that social skills are the tools in life that are needed to create and maintain friendships, to cope in a team and later to create a successful lasting relationship. Effective social communication requires empathy, high self-esteem, a balanced emotional life, analytical skills, and the ability to control and evaluate one's behavior (Keltikangas-Järvinen 2011). So it is possible to highlight the descriptions of social skills that arose from the goals of social skills training: developing self-awareness and positive self-esteem; developing empathy and a positive attitude towards those around you; developing communication skills; developing cooperation skills.

As a recommendation, information about a focus should be shared, then attitudes should be formed, and after that a change in behavior can be evoked in a person with a sufficiently well-informed and "correct" attitude. (Cornelissen 2011). Based on the analysis of Evans, McMeekin, Southerton (2012), it is strongly recommended to consider the following principles when designing social change: focus on the intersections of different practices and different elements of practices (both material and mental), i.e. everyday complexes rather than isolated behaviors. In other words, the influence of the components of meaning (opinions, attitudes, representations), skills, competencies, social interaction as well as the material environment and things, i.e. the elements of practice, is directly related. Campaigns in the "raise awareness" style are justified in part, can generate talk (although usually in the short term), but do not guarantee a long-term change in behavior.

Social skills mean the ability to be with others and to cope with different social situations. Sociality, as an innate temperament, supports the acquisition of social skills, but does not guarantee their existence. Social skills are developed through experience and

upbringing and do not necessarily have to be based on one particular temperament. Social skills also reflect personality traits more broadly, as the social skills that someone accepts reflect their ability to value and respect peers, the ability to respect the rights of all people and the willingness to act according to agreed rules, to be a good listener, etc. A person may be very social and wanted to be in the company of others, but still unable to behave in different social situations (Keltikangas-Järvinen 2011). Character education is influential trend. The goal is to create an environment in which to support behavior in accordance with agreed values (eg, health behavior). The focus is on behavior and feedback. Communicating values happens sometimes invisibly, on a daily basis (Jung, 2013). Li, Hestenes, Wang (2016) emphasize the importance of play in the development of social skills, especially in younger people. This can be seen as a key activity in learning, but also in developing social skills. The game allows communication between everyone else. Imitation, role-playing or dramatization allows to break the connections between imagination and reality. Imitation games have been found to be positive in creating relationships between children. Social role play has a strong link between the three social skills, self-assertion, cooperation and self-control. Li et al (2016) emphasize that adults must consciously promote social imitation games. Here we have to distinguish virtual from other games.

Methods

This study applies a qualitative research strategy. Semi-structured individual interviews were conducted with 18 youth workers, who has worked in the youth center at least 2-3 years. Pilot interview was conducted with a youth worker, who had over four years work experience. After this the questions were developed and clarified. Interviews were conducted individually with each interviewee in 2017-2018, and lasted usually from 1 to 2h, were recorded on tape. The interviews were in a quiet place at the university or at their work place, usually before work time. Interviews allowed people to freely talk about their lives with their own words and personal, intimate communication between researchers and interviewees (Kvale, 2006).

The data-driven thematic analysis process was used. It included six phases. First, all recorded interviews were transcribed, read and initial ideas noted. Next, initial codes were generated regarding the phenomenon (communication skills and strategies). In the third phase, the different codes were sorted into potential sub-themes and key-topics. Subsequently, the content of the created sub-themes and key-topics were checked. In the fifth phase, all sub-themes (29) and key topics (7) were refined and named. In the last phase, the final analysis was written. The results were based on analysis of a qualitative content analysis principles. Saturation of the data was achieved (Creswell, 2005). The anonymity of the sample was ensured. Protecting participants and respecting their right to make decisions regarding their participation were the core ethical principles guiding the treatment of the participants in the study. Participation was voluntary and participants were informed of their right to withdraw at any time without consequences.

Results

Interviewees mentioned mostly important the dealt with **social problems**: prevention of alcoholism, drugs, smoking reduction; unemployment and material inequalities, mental health disorders; behavioral problems and poor communication skills and work with NEET-youth (usually in program Tugila). Social problems are sometimes more in focus than other directions */We do quite a lot of things that can be measured, even if the forum theater performance, we ask before and after opinions, such as behavior or alcohol consumption/. It turned out that similar to previous studies, more often youth workers in the role of advisor,*

teacher, trainer, manager, hobby instructor, psychologist. The activity and interests of young people are different, therefore situations in everyday and in activities often vary. */Before, they used to drinking beer secretly, but we made arrangements. Most found a hobby, such as making a band, or no longer visited us.//Young people help to build a swimming area for example/ /..Our youth clean the youth center themselves, we haven't done it in a long time..it's their house and they keep it now.//A group appropriated youth center, forbidding others to go there.//Health behavior meetings, trainings and also career events// Young people gain experience in volunteering.//Youth have changed, more and more people want to consume, less to invest. Now we had a hard time finding for help to paint our house./ Youth workers are often as in “parents” roles: /The main problem is that young people do not get enough attention from parents/. Young people's feedback and positive attitudes were evaluated.*

Coping with different social situations and developing youth cooperation skills. There were examples of trust between youngsters and the youth worker. For example, a youth worker has positively resolved cases of cyberbullying. */Attention must to paid to the internet risks. Youth are very active users of social media./ Their goal is the desire to be in contact with others – to a greater extent, more regularly and more rapidly. Thus is important that digital solutions be seen as new opportunities in YW /Although we have a lot of bullying-free programs in schools, there is a lot of it.. often out of boredom, and low attention and social skills/. Many youth workers have supported the employment of young people through personal contacts. /Two girls got a job in a familiar café/. Working and sheltering are supportive activities. /Solving the theft problem, there was bad family behind. Children stole the phones// In cooperation with the police, we have resolved many conflicts between young people and parents. They already know that if he/she disappeared, they will be in the youth center/.*

In youth projects they can collaborate, lead activities, took responsibility and gained new experiences. */It is important to guide them and share experiences, in case of mistakes reflect on why, for what reasons?/ Youth counselling is one of the main work tasks very often. There were many cases in psychological, career or vocational counselling. /Some people come back, if they are very hard in their lives or if they can't cope with it anymore. For example: one young, man who had an accident, studies after the counselling the specialty, even though there was a risk of falling out of school.//One youngster asked for art supplies with the prison and sent us drawings from there./*

Developing empathy and a positive attitude towards those around them. A good relationship supported youth worker mostly in work. */The young people have already grown into men and when they saw me in the store, they asked for help to take the shopping bags home to me. They shared stories about their lives and work abroad.// Parents brought their children into the youth center, because they know the activities are interesting.//We have youth an average of 4-5 different nationalities. Multicultural is our key word, different events and trainings took place into account other cultures... The once feared street(got beaten) has become a house full of positivity. Certain of our annual events are expected/. Youth workers' personal relationships are often meaningful, especially when material resources are limited. /We work with co-operation institutions (shops, studios, cinemas) and the Estonian Defense League/.*

Developing communication skills, self-awareness and positive self-esteem. It was revealed that youth workers mainly support the development of young people through hobby activities and in project-based approaches. */I am mentor for an adventure education group, another art studio leader or music teacher.//Our camps are well-known and filled up fast all times/ At the same time, communication skills were developed, goals were formulated, and experiences were more convincing and understandable. Knowledge can also be expressed through experience.*

/You must to have an interesting activity, you need to be able to communicate well, to solve problems, to make completely foreign people work together.//I can contact with the young people as soon as possible, a trusting relationship and changes already seen through dance and movement/. Several examples were mentioned, where a young person is allowed to think and perform, lead the activities /One young man wanted to be active and organized sports competitions.//The problematic girl was as the dancing party host.. time changed her.//Those who study elsewhere come to the house on Fridays or weekends and help to organize big events, for example./ Many young people have gone to study youth work /They find the youth worker an example and to be a youth worker is challenging, interesting job./ Successful activities increase the young person's self-confidence, create a good mood, responsibility to complete the activities. Successes create the precondition for new events. Wishful thinking alone is not enough, you have to be enterprising. This is also supported by youth workers. Positive self-esteem is an important value for proactivity, communication, cooperation. It help to resolve or prevent conflicts more easily, to avoid communication barriers. Several cases explained young people's re-contact with teachers, support for compulsory schooling, learning to learn. /They saw, that we are continuing our studies at university and are also trying to finish the class.//I met with former young people from time to time somewhere in a café and talk about how it has gone. I am especially happy when a problematic young person has grown up, started to study or work. I see the results of my work later, but not always/. However, the results are important in YW.

Discussion

YW has to be reported to a wide range of stakeholders: young people, parents, teachers, local communities and the whole field of YW. In light of the demands and expectations of European and Estonian YW, youth workers must deal and be considered as educational staff. Conflicting interests and goals make it difficult to understand youth work and also to make sense of those interested, because, for example, process versus result, activities open to all versus target groups (Siurala, 2017; Williamson, 2017). The reputation of youth centers has increased, but there are often problems with young people's behavior and Dealing with young people's social problems is not always the task of a youth worker, as expected. To this end, cooperation was established with social educators, social workers and the police. In many cases, youth workers have trusted young people in the hope of behavioral change.

Young people have different interests and personal activity (laziness, low external motivation), low desire for team-work. The reasearch revealed that youth workers were often instructors in clubs/studios/ hobby activities and project work leaders. Experienced staff have developed their own techniques on how to involve young people, their perceptions of working with different young people or with different communicators; skills to work in a multicultural environment. Hobby activities were considered a good way of reaching to youth, if necessary. The development of experience in action is often also related to verbal formulation. Expression makes it more convincing, acceptable. In turn, communication skills, language skills, the habit of expressing and reflecting are important. But this does not mean that experience must always be formulated. It turned out that knowledge of multiculturalism, physical activity (its lack), entrepreneurship, health is important. Life events shape a young person's values and satisfaction with life to a great deal. Discontinued studies or inability to find work force young people to re-examine their current values and are accompanied by a decline in subjective well-being. The influence of negative life events to satisfaction and value orientation is not immediate but takes place over a longer period of time.

Effective solutions for increasing youth involvement can only come about when different fields and institutions work together, it may be the family, friends, teachers, youth workers, counsellors, but also the police or doctor. Every case is unique, with each individual

the trustee might turn out to be different. Young people expect reasonable attention, discussions, appropriate challenges, and are often innovative.

Experienced youth workers had basic knowledge and skills in YW, their strategies (how to communicate, involve people, resolve situations) and methods (active learning with educational goals) were suitable to better cope with work. Youth worker must be patient, friendly, enthusiastic, creative, good communicators and advisers. Mostly, the purpose of YW has been to promote the development of a young personality, rather than developing the skills needed to work in a particular office or group. Therefore, there should be more cooperation with affiliated organizations contributing to it.

Conclusion

This research contributed to prove the importance of YW role to create a better footing for young people to achieve their potential and make decisions that affect their lives, as well as to support their active participation in life, in society and coping on the job market. The research confirmed, that the reputation of the youth centers has risen, but there are often problems with the behavior of young people and their communication skills need to develop. The study revealed that the desire to work with young people and trust are a prerequisites for successful youth work. Youth worker was quite often as a trustee and could be used positively, for example, as an educational support for young people, pedagogical counseling, etc. The methods for YW in Estonia have to meet the new challenges and needs of the youth and to offer, especially during the period COVID-19, through contemporary solutions and suitable channels, new and attractive opportunities and alternatives to those offered solely for example entertainment-oriented purposes.

Youth must be more interested in social issues. Supporting for raising young people's communication skills, supporting the formation of the self-esteem, increasing self-confidence, better readiness for different communication situations, openness are important in youth work. Knowledge of the basics and methodology of YW, educational sciences, social-psychology, hobby activities etc., support both: the teaching and leading non-formal activities; understanding and guidance of young people and empowerment, which are expected to cope for professional youth worker.

The research introduces further questions of study: personal and professional identity in youth work.

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Using Technical Translations to Motivate Engineering Students to Learn English as a Second Language

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Abstract

The purpose of this paper is to show how using technical translations as exercises could help motivate Engineering students to learn English as a second language. The teachers can present to them the features of technical texts, which include frequent use of present tense, modal verbs, infinitive of purpose, passive voice and noun phrases. Afterwards, some translation procedures could also be exemplified to them applies to the translated text. In addition to just teaching Engineering students some technical terms from their domain, which they can also look up when needed in dictionaries, it is all the more motivating for them to be aware of the importance of studying elements of grammar which can help them when they present for business purposes a project in their domain and try to establish partnerships. Technical translation can thus be part of teaching English for Specific Purposes for Engineering students, so much as if not even more than terminology.

Keywords: passive voice, modal verbs, noun phrases, ESP.

Main Conference Topic: Education, Teaching and Learning

Introduction

Technical translation can be used as a means to motivate Engineering students for studying English as a second language during their first two academic years at the Technical University of Civil Engineering Bucharest, Romania. These students expect to apply their knowledge of the English language to the Engineering domains that they are studying, such as Hydrotechnics, Geodesy, Building Railways and Bridges, Building Equipment, and Technological Equipment. All grammatical notions should, thus, be adapted to their needs, which include the ability to translate technical texts from their Engineering domains. Considering that, sometimes, learners of a second language think in their native language and then translate what they mean to say in the second language, translating technical texts in class can be a useful exercise. In this way, students can be familiar with the features that are specific to this type of text and realize the importance of doing separate exercises regarding the use of present tense, modal verbs, infinitives of purpose, passive voice and noun phrases. The use of specialized vocabulary comes in second, since these students are studying English as a foreign language during their first two years, the same time when they are acquiring the basic notions in their Engineering subjects.

As a result, just presenting students general English grammar applied only to everyday life situations can feel un motivating, especially since they have already studied English as a second language in their secondary school studies and highschool studies, and are thus proficient in this language. They study English as a second language at intermediary, close to advanced level at university, depending on the general level of the group of student, and thus

can start studying English for specific purposes and applied to their needs. Otherwise, it would be disappointing for them and unmotivating to continue studying what they already know. Psychologically speaking, it is more motivating to apply grammatical notions to texts from the Engineering or general technical field, so that they feel that their interests are taken into account by the teacher.

For these students, who are very enthusiastic in their first year about the subjects of study in their domain, it is motivating to learn new notions related to the study of the English language as well. In their essays at the beginning, when their level of English is being tested, which are about why they wish to become engineers, they mention that they have been inspired by their fathers' passion for the domain or by their enjoying as children to play with building games such as LEGO or by their interest in how the things around them are built. Thus, teaching them new things about the English language, different from what they have recently studied in highschool, can be sure means to attract their attention and ensure their receptivity. Adding notions about Newman's (1988) translation procedures used for technical texts can help them become aware of the importance of grammar knowledge.

Theory

First of all, what motivation theories could be applied to improving the way that Engineering students study English as a second language? According to Brown (1987), motivation is defined as "an inner drive, impulse, emotion or desire that moves one to a particular action". Since Engineering students are passionate about their domain, they will find it motivating to apply knowledge of the English language to their field of interest. For Ausubel (1968), there are "six needs and desires that are integral parts of motivation: the need for exploration, the need for manipulation, the need for activity, the need for stimulation, the need for knowledge and the need for ego enhancement" (Daskalovska et al., 2012). If we present during the English classes brief technical translations to students, they will find the need for activity, stimulation and knowledge satisfied. Also, if we present students with the theories related to the features of technical texts and with the translation procedures, they will find their need for exploration satisfied during this class.

Impersonality could sum up the general characteristic of technical texts (Miššíková, 2003), which is created through the use of the passive voice, the pronoun we used as a general pronoun, use of third-person, noun phrases, or nouns which refer to abstract notions formed by verbs and adjectives (Turner, 1973), as well as infinitives of purpose and modal verbs. Another feature is represented by impersonal sentences which begin new paragraphs using *It is true that..., but... It is obvious that...* (Knittlová, 2005). If used together with a modal verb, such impersonal sentences lead to the modal verb to lose its lexical meaning, e.g. *It should be noted, It could be remarked*. The modal verb *should* shows less authority than the modal verb *must* in technical texts (Knittlová, 2005), e.g. *Safety precautions should be observed at all times*. The imperative is also used in expressing formulas or hypotheses, e.g. *Assume a Cartesian coordinate system... Let V be the vector analytic signal...* (Knittlová, 2005). Other features relating to the impersonal style of technical texts are the objectivity, preciseness, and lack of emotions (Knittlová, 2005). Otherwise, technical texts include specialized terms pertaining to the various engineering domains students could be interested in. These terms can be found in bilingual dictionaries, but also in dictionaries which are only in the English language and which offer the definitions for the respective terms. Most of the time, students prefer electronic dictionaries, which they find handy at all times when they need them.

In order to motivate students further, they can also be presented with a few notions of Newmark's (1988) translation procedures, with the mention that most of the times for translating technical text, faithful translations are preferred, which attempt to keep the contextual meaning, as much as the grammatical structure of the target language allows. Transposition can also be found in the translation of technical text, as it is a procedure which involves a change in the grammatical category from the source text into the target text due to the differences in the two languages. For example, a verb can be turned into a noun, or a singular can be turned into a plural or the other way round, due to the way that it may sound better in the target language, while preserving the meaning. Sometimes, the word order in the sentence can be changed, or the sentence can start differently in the target language than in the source language. Borrowings can also be found in these translations, especially since in technology the terms are usually not translated from the English language, but preserved. The translation procedure of transference refers to taking over a certain word from the source language into the target language. Of course, for Engineering students, since they are not professional translators, there will be only these few notions of the translation procedures, directly applied to the technical texts. They will be presented only as additional means to motivate them and spark their curiosity, as well as make them feel that the English language seminars are tailored to suit their needs. However, they do have an advantage as translators in this field, since they also have the specialized knowledge of the domain. Even if they do not become professional translators, they will have at least the advantage of being able to do their own translations of their own documents, presentations, and even research papers by applying what they have learnt in the English language seminars.

Since Engineering students are also familiar with the technological domain, a further motivating factor for them for attending and being active in the English language classes could be sharing with them notions about computer assisted translations, applied to the domain of technical texts. They can be told that they can use specialized software which can be taught specialized vocabulary and terminology for their domain, and when they translate, they only need to correct the translation done by the software. They could practise by using free translation software such as MEMSOURCE, in order to see the advantage of CAT tools. Some translation softwares also offer the possibility of selecting the exact domain for translation. Obviously, one of the advantages of the computer assisted translation is less time for translating, since the software already offers a basic version which can be improved. Terms are usually correct, only sometimes do they need checking. As a downside, some meanings of the sentence are not usually correctly or precisely translated by the software, so the human translator needs to intervene to correct. As an advantage, the software can be taught to memorise terms and structures frequently used by the translators in their domains.

Methods

At the beginning of their first English language seminar in the first year, students express their expectations regarding these classes, so a needs analysis can be done right away. The majority expect the foreign languages classes to be directly related to their Engineering domain, so English for Special Purposes principles can be used. The teacher can choose the materials from textbooks using technical texts. In these textbooks on English for Engineers there are various exercises, starting from reading comprehension, vocabulary, grammar, as well as short texts proposed for translation. Translations can be used as a means of helping students better understand a text, or to allow them to show that they understand it. In Table 1, we have an example of exercise, with the source text taken from (Dănilă, 1967) and the target text from the same textbook, used in the English seminar for Engineers in order to allow them to identify features of technical texts and a few translation procedures. The answer key is also provided in

this table, but for students it will be given at the end of the exercise, after they provide the answers themselves:

Table 1: Example of Translation Exercise

<p>I. Source-text:</p> <p>The electric motor receives electrical energy, and converts it into mechanical energy. There are different types of electric motors. The alternating-current motors may be: synchronous motors, polyphase induction motors, single-phase motors. Direct-current motors may be grouped into three main classes: series-wound motors, shunt-wound motors and compound-wound motors. The direct-current motors are less frequently employed than alternating-current, yet they are still used, because of their excellent speed control and starting torque.</p>
<p>II. Target-text:</p> <p>Motorul electric primește energia electrică și o transformă în energie mecanică. Există mai multe tipuri de motoare electrice. Motoarele cu curent alternativ pot fi: motoare sincroane, motoare polifazate și motoare monofazate. Motoarele cu curent continuu pot fi grupate în 3 clase: motoare cu excitație în serie, motoare în derivație și motoare compound. Motoarele cu curent continuu sunt mult mai puțin utilizate decât cele cu curent alternativ, dar sunt încă folosite din cauza controlului foarte bun al vitezei și cuplului de pornire.</p>
<p>Answer Key:</p> <p>Technical Text Features:</p> <p>a) Grammatical features: - present tense; - modal verbs: <i>may</i>; passive voice: <i>are less frequently employed, are still used</i>; noun phrases: <i>alternating-current motors, polyphase induction motors, single-phase motors</i>.</p> <p>b) Lexical features: specialized terms</p> <p>c) Stylistic features: objectivity, conciseness, precision, lack of emotional involvement</p> <p>Translation Procedures:</p> <p>a) Transference: <i>motoare compound</i></p> <p>b) Transposition: <i>motoarele cu curent alternativ; Motoarele cu curent continuu; motoare cu excitație în serie, motoare în derivație</i></p> <p>c) Literal translation: <i>motoare sincroane</i></p>

Students can be given both versions, of source text and target text, or they can be asked to provide the English (or Romanian) translation themselves. Either way, this type of exercise can be used for them to efficiently practice the basic notions related to technical texts. Other similar texts can be used from all Engineering domains in order to help students practice even the use of modal verbs or passive voice, if they are asked to translate the Romanian text into English. They can also see how various features are preserved in translation, and thus understand the need to also have a few basic notions of grammatical terms in both English and Romanian. They can use their basic knowledge of these grammatical notions in order to understand what happens with the translated text and also to see how to deal with specific features of the technical text, even when writing such a type of text themselves.

As part of another exercise, students can be asked to introduce either the Romanian text or the English text into a free CAT tool site, such as MATECAT, SMARTCAT, OMEGAT, or even the trial version of MEMSOURCE, and experiment with the way that the text comes out in translations and see where they need to intervene to adjust it. Afterwards they can be asked to find which are the strong and which are the weak points of computer assisted translation, judging by their experiences with them, as well as which CAT tool they find the most helpful and easy to use.

Findings

Engineering students also have a good general culture background, and this can be used to further develop their reasoning and argumentative abilities. The translation exercise can be further used for other purposes, such as arguing for or against computer assisted translations, and ask these students to do some research on the Internet about the way that it could be applied to technical translations. The learning schedule for English language seminars also includes writing essays arguing for or against, for expressing opinions, as well as writing reports and letters, be they familiar or formal. They can write about their experience with CAT tools in either of these forms. They can also be asked to exercise their presentation skills in front of the classroom, another skill which is included for the English seminars, either by preparing themselves a presentation on the subject of the use of CAT tools, or by reading a scientific article on the topic and the briefly presenting it, e.g. *A Study on the Efficiency Influence of Computer-Assisted Translation in Technical Translation* by Zhang Lin (2016).

Considering that it is important to take into account the personal or career-related interests of the learners, it is a good occasion to do so in this case by using technical texts and CAT tools in order to adapt the English seminars to the Engineering students' needs. Otherwise, they may have the impression that they are not progressing in the learning of the English language in the seminars, become less motivated, and their level of the English language might get lower at the end of the two years of study.

Some students prefer grammar exercises and do not find it easy to write long essays. However, if the essays are not simply about general topics of everyday life, as in highschool and secondary school, then they may find it stimulating to write about something that preoccupies them or that they have recently found about and find interesting and relevant for their interests. While students enjoy the fact that they can rely at times on what they already know and they wish to continue studying the English language instead of choosing another language available at the Technical University of Civil Engineering Bucharest, from beginner's level, they still need stimulation in order to find these classes interesting and wish to attend them, instead of just coming at the end for the exams.

Discussion

Giving students motivating study material is, however, just one part of getting their interest in order to attend the English classes. If they are given grades for class activity every time, and they can find them written down on the attendance list, and if these grades are taken into account for the final grade, then they find it all the more motivating to attend the English seminars.

What is more, in order to understand the extent of their preoccupation with technology, which has after all become part of everyone's daily life, we could also take into account the fact that, during the COVID-19 pandemic, when classes were held on online platforms,

attendance got higher than in the face-to-face classes. This could be since the online environment has become such an integral part of their everyday lives. They found the online environment more stimulating for attending classes, studying and sending their class activity.

As a general observation, Engineering students at the Technical University of Civil Engineering do not find homework outside the classroom stimulating and usually ignore it. However, they enjoy working during the class, especially if they know that their efforts are taken into account and they receive grades for class activity which they can find written down in the table on their attendance list.

The grades for class activity can count as rewards, and the work done during class can count as an effective way to spend their time during classes. They view thinking about the use of what they learn for their future profession a lot, and so they find the activities related to technical texts and computer assisted translation very stimulating, since they find them to be extremely practical for what they plan to do in their careers.

Conclusion

Translations can be presented as extremely attractive, but also very useful, activities for Engineering students. Related to them, the teachers can develop further activities, which are just as stimulating and as useful. The English as a foreign language seminar curricula should be adapted to the needs of Engineering students, so that these classes are both interesting as well as useful for them, so that they are motivated to attend them and to participate actively in them.

Engineering students can be made to realize that learning a foreign language is a lifelong process, and that they can combine their passions for technology and engineering with their foreign languages skills in order to ensure their successful careers in the future.

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Brief biographies of the authors

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Irina-Ana Drobot was born in 1983 in Bucharest, Romania, and graduated from the University of Bucharest in 2006. She was awarded a PhD from the University of Bucharest in 2014 with a thesis titled *Virginia Woolf and Graham Swift: The Lyrical Novel*. She is currently a lecturer, PhD at the Technical University of Civil Engineering Bucharest, teaching English to Engineering students, as well as a course in *Culture and Civilization*.

Patriotic education of youth in the ideas of Eugeniusz Piasecki

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Abstract

Eugeniusz Piasecki was one of the greatest Poles. He primarily contributed to the development of physical education and scouting. He was a globally recognized expert. In his ideas he postulated to include elements of native cultural heritage in the canon of education. For most of his life he studied Polish folklore in games and activities. He was also a spokesperson for the introduction of universal teaching of Polish folk and national dances.

The purpose of this work is to show the contribution of Professor Eugeniusz Piasecki in promoting native cultural heritage in Polish education as a part of patriotic education. Based on the conducted research, it can be concluded that the ideas of Eugeniusz Piasecki regarding the introduction of Polish cultural tradition were reflected in the formation of program principles of Polish scouting (*harcerstwo*) and in school exercise programs in the interwar period. These issues were also included in the physical education teacher training programs. Patriotic education implemented that during and after school activities were meant to prepare for sacrificial work for the homeland.

Keywords: Patriotic education, folklore, physical education, games and activities

Main Conference Topic: Education

Introduction

Eugeniusz Piasecki (1872-1947) was one of the most eminent Poles. At the beginning of 20th century he propagated scout ideas in Poland. In the interwar period, he worked for the development of physical culture. He created the first academic center of physical education teachers training - Physical Education Studies at the University of Poznań (Toporowicz 1987, pp. 27-29).

He also made a significant contribution to the preparation of school physical education programs. He fought for including Polish national heritage in universal education. He was the most outstanding researcher of native folklore in the field of games and activities. He was a valued international expert in the field of school hygiene and physical education. He sought to nationalize physical education and believed that appropriate educational work in this area contributes to the education of patriotic attitudes and strengthening of one's national identity (Głasek 2008, pp. 13-22)..

Purpose and method of research

The purpose of this work is to show the contribution of Professor Eugeniusz Piasecki in promoting native cultural heritage in Polish education as a part of patriotic education. The research used historical methods, primarily the method of critical analysis and interpretation of source materials. Elaborations were also used.

Youthful years and education of Eugeniusz Piasecki

Eugeniusz Piasecki came from a family with strong patriotic traditions. His father Wenanty Piasecki was one of the leading activists of the Gymnastic Society *Sokol*. Eugeniusz spent many years studying at home before he entered the St. Jacek secondary school. During that time he additionally attended classes at the Academy of Fine Arts in Krakow. He studied at the Faculty of Philosophy at the University of Lviv, but, being persuaded by his father, who had his own hydrotherapy plant in Zakopane, he changed his chosen major and began studying medicine in Krakow. In addition, he also obtained the right to teach gymnastics in high schools and teacher training seminars.

In Krakow, he had the opportunity to learn about the work of Professor Henryk Jordan. It is possible that personal acquaintance with Jordan influenced the choice of young Piasecki's life path. Jordan understood the importance of movement for the proper development of children and young people. Thanks to strenuous efforts, he obtained the land to build one of the most modern parks in Europe intended for recreation of the younger generation, especially those poor and in need of care and education. He convinced many enlightened activists to support his idea. Among them were Zygmunt Wyrobek, Stanisław Ciechanowski and Eugeniusz Piasecki. The main form of classes conducted in the park were games and activities. The spirit of loving the homeland was an important part of education. Important historical events were mentioned and great Poles were talked about. Piasecki willingly took part in works with young people in the park founded by Jordan (Toporowicz 1987, pp. 21-41).

In his youth, Piasecki was an active member of national liberation organizations. The activity in Euleusis had a great impact on his life attitudes. All his life he was faithful to the slogan of quadruple abstinence: from alcohol, tobacco, gambling and debauchery. He also promoted these slogans among young people. Youth self-education played an important role in this type of organization. The youth organized themselves to educate each other. Nurturing native language and culture was a source of patriotic attitudes, rooted the young generation in their own tradition and was the basis for strengthening their national identity.

Development of the scout idea in Poland played an important role in shaping Piasecki's views. He joined the propagation of a new movement on home soil. He recognized his high educational qualities; however, he thought the assumptions for working with Polish youth should be adapted to their conditions and needs. He suggested that elements of Polish tradition and culture should be included in ideological and educational work. There were signs of activity in Eleusis. Piasecki proposed an accepted name for Polish scouting - *harcerstwo*. Together with Mieczysław Schreiber, he published in 1912 a scouting textbook entitled *Harce młodzieży polskiej*. This organization largely contributed to national liberation activities. The youth participated in self-education, there were numerous talks on topics related to the history of Poland. The practice of scout camp organization was also transplanted onto native soil (Toporowicz 1987, pp. 103-140).

Piasecki returned to Lviv, where he started working as a teacher. As a young husband and father, he felt responsible for the fate of his family and tried to provide it with adequate financial resources. He soon obtained a PhD degree in medical science. He started working at the University (1909), where he taught school hygiene and physical education theory. He intensively began working on collecting native games and activities. He worked a lot socially, constantly improved his professional and scientific skills. He visited many other countries like England, Belgium, Denmark, France, Germany, Switzerland and Sweden.

He took part in international scientific congresses, among others Nuremberg, London and Paris (Głasek 2009, p. 81).

Piasecki was internationally acclaimed - he was delegated by the Hygiene Section of the League of Nations for scientific travels to 13 countries. His excellent education, intelligence and wisdom, as well as an impeccable ethical attitude in life won him many friends (Toporowicz 1987, pp. 283-287, Głasek 2007, pp. 82-83).

During World War I, he continued to research games and plays. He was asked to publish the results and make them available for work with children during summer camps. Piasecki reissued his work titles *Zabawy i gry ruchowe dzieci i młodzieży ze źródeł dziejowych i ludoznawczych, przeważnie rodzimych i tradycji ustnej* (Wrzosek 1948, p. 6, Głasek 2008, pp. 14-16).

Activities for the development of physical education in the interwar period

At the end of World War I, Stanisław Ciechanowski asked Eugeniusz Piasecki to work on school curricula. Everybody believed that Poland would regain independence soon. The teaching community was preparing to introduce universal teaching system throughout the country. There were stormy discussions on the development of the entire school system. Piasecki undertook this task and coordinated work on school physical education programs throughout the interwar period (Głasek 2009, p. 83).

He was also invited to create the first Chair of Physical Education in Poland at the University of Poznań. It was the third academic center educating physical education teachers at the study level: after Ghent and Copenhagen (Grot 1970, pp. 20-23). To this day, the accuracy of the program assumptions for this field developed by Piasecki over 100 years ago is striking. The canon of classes has practically remained to this day! It includes biomedical (anatomy, exercise physiology, etc.), humanistic (pedagogy, psychology, history of physical culture, foreign language) and physical (light athletics, gymnastics, games and activities, dances, etc.) classes.

The first years of existence were marked by the struggle for the final shape of Polish borders. Authorities of the University of Poznań actively joined in supporting the youth setting out on the front during the Polish-Bolshevik war in 1920. All types of aid were organized for student soldiers. Only after the end of regular fighting did the situation begin to stabilize.

The Chair was soon turned into a Studium. Thanks to the efforts, it was possible to obtain better housing conditions (at the beginning it had two small rooms and the rest of the rooms were rented). Cooperation with the Main School of Gymnastics and Sports in Poznan started. The combination of personnel (knowledge and experience of employees) and material resources gave a synergy effect, both institutions flourished. The friendship between Eugeniusz Piasecki and Walerian Sikorski played an important role. Summer and winter camps were quickly incorporated into the program of Physical Education at the University of Poznan.

Piasecki proposed several types of paths for future PE teachers: two or three year long, as the main and additional subject. He was an advocate of embracing academic youth with compulsory education in physical education. He quickly gained the support of the university authorities and fulfilled his goals. He believed that with such staff shortages, every university

graduate should be able to teach physical education (Toporowicz 1987, p. 273, Głasek 2007, p. 88).

A specialized library was created at the University of Poznań's Studium of Physical Education. Thanks to his own efforts, the professor gathered an impressive collection: through exchange, for reviews, as a gift, etc. Many major works in physical education were obtained in this way. The library also contained many Polish and foreign magazines (Grot 1970, pp. 29-30).

Eugeniusz Piasecki has created "Physical Education" - the most important and the largest specialist journal in the period of the Second Polish Republic. All materials that could be helpful for physical education teachers were published there. In the first years there was a cycle in which the most important currents of physical education in Europe were discussed. It contained lessons, reviews of the most important items of professional literature, methodical materials, original articles of outstanding personalities of the world of physical culture (e.g. Elli Björkstén, Ellin Falk) and even the most important information on current affairs. The chronicle and announcements column occupied an important place. There were guidelines about various types of courses and possibilities of applying to them (Toporowicz 1987, pp. 248-252, Głasek 2018, pp. 144-150).

Activities for the promotion of Polish cultural heritage

In the first number of "Physical Education" there was an appeal regarding Polish games and physical activities. Piasecki, using the reach of the magazine, appealed to join the great work, which was to save Polish folklore in games and physical activities (*W sprawie gier i zabaw ruchowych polskich*, 1920).

The appeal gained great recognition. Numerous responses were received. He postulated to limit foreign influence in his speeches and articles. He recommended popularizing native games among young people, such as palant, krąg, kiczka, etc. He was a strong opponent of foreign games, among others football, baseball, basketball, he also emphasized the negative impact of competitive sport on the education of young people (Piasecki 1936, Głasek 2009, pp. 16-17).

Once again, he resumed an appeal in the pages of "Physical Education" for collecting games and physical games in 1927, when the magazine already had a large group of readers. The action brought unexpectedly large fruit. Piasecki has included students and employees of the University of Poznań in the work. He also received government assistance (*Ankieta w sprawie zabaw i gier ruchowych polskich* 1928, pp. 113-115).

His great interest in games and activities was directly reflected in the school programs he constructed. Games and activities from the first editions were included in a separate teaching part (Piasecki 1922). Piasecki's textbook's extraordinary value was fully recognized during the interwar period. The material consisted of games collected during library queries in Kiev and Lviv with the help of surveys conducted among refugee children. The material is still used in didactic and educational work, for example in pre-school education, e.g. "Ojciec Wirgiliusz", "Julianka". The range of suggestions was very wide - from the youngest to the oldest volunteers of fun. The added value was the opportunity to conduct lessons in games and activities in poor housing conditions and without needed equipment.

The introduction of universal physical education was a lofty intention. In fact, this highlighted the weakness of universal education. Only a small percentage of schools had

a playground, and less a gym, often not meeting any sanitary requirements. The situation was improved by a football bill by Eugeniusz Piasecki (1923) imposing the obligation to organize at least one court in each commune. Another legal act to patch the lack of finance for gymnastic equipment was the so-called "Activities and games fund" collected from every pupil who could afford it, because poverty was widespread at that time. Most often, the pupils made simple accessories by themselves. In such circumstances, activities and games promoted by Piasecki worked best (Głasek 2018, pp. 141-143).

He looked at teaching in a modern way. In accordance with the postulates of the "Teachers' Sejm", which took place in Warsaw in April 1919, and other modern trends, he realized that teaching should affect all spheres of the pupil: body, intellect and ethics. The entire education was to be organized in such a way as to support students in comprehensive and harmonious growth.

An important place in his scientific and didactic achievements was occupied by the issue of patriotic education of the young generation. From the beginning he devoted much attention to this issue. He introduced many elements of Polish folklore to inter-war curricula of physical exercises, among others motor games and activities. He was a supporter of including folk dance and national dances in the teaching. He also included elements of sightseeing. He recommended trips to the immediate vicinity and further aimed at learning about the material and immaterial cultural heritage of his region of residence.

He suggested visiting folk artists, cultivating traditional customs occurring in a given region, teaching folk songs and dances, as well as visiting more and less known monuments. He believed that love for the homeland should begin from the immediate area. This was reflected in his concept of national physical education. He was a supporter of educational influence on the charge, at the same time on all spheres of his personality (Program nauki w gimnazjach państwowych. Ćwiczenia cielesne (project) 1933, Głasek 2008, pp. 19-23).

The situation of the School of Physical Education at the University of Poznań was changed in 1929 by the transfer of the Main School of Gymnastics and Sports to Warsaw and its merge with the National Institute of Physical Education into the Central Institute of Physical Education. Also "Physical Education"'s publishing house was moved to Warsaw. The spinning of the financial tap by Sanacja changed the possibilities of acting, including limiting the possibilities of publishing. But the opinion of Professor Eugeniusz Piasecki still had to be respected because he was a known expert on a global scale. He continued to develop the concept of national physical education and prepared subsequent publications for publication, actively participated in scientific life (Głasek 2018, p. 234).

Conclusion

Piasecki's work has a unique value. In an above-average way, his methodical assumptions combined the training of physical and spiritual qualities. Familiar with contemporary pedagogical trends, he knew that the best results in learning give practical activity combined with intellectual education and moral improvement. Understanding native cultural roots was, according to him, an important element of educational work carried out during physical education classes. Thanks to his activities, patriotic education entered the canon of education of Polish youth to a considerable extent. He believed that shaping your own national identity should begin from the earliest years of life.

Eugeniusz Piasecki was a booster of our native tradition. In his opinion all its manifestations should be written down while they were still lived. He was particularly interested in children's folklore, especially in the form of games and activities. His textbook became an important reference to curricula, because the material published in it was to be the basis for the implementation of school physical exercises.

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From 2007 I am working at the Section of the Physical Education of the Cardinal Stefan Wyszyński University in Warsaw. I am fitness instructor. I received the Master's degree in three fields: *Tourism and Recreation*, *Physical Education* and *Musicology* I earned my first Phd in the 27th of November 2018 in the Academy of Physical Education in Warsaw. My doctoral dissertation was titled: "Development of musical-motor forms in the education of the Second Polish Republic". From October 2019 I am a student of the Doctoral UKSW School. I am working above the second doctorate in Pedagogy. Its theme is: "The physical Education as the factor supporting integration of foreign children at Polish nursery schools". Moreover I finished 3 fields of the post-graduate studies: *caregiver of the seniors* at the Bogdan Jański Professional School in Warsaw, *pre-school and early-school pedagogy* at Pedagogic Department of Christian Theological Academy in Warsaw and *special pedagogy* at Cardinal Stefan Wyszyński University in Warsaw. I was the Erasmus Student at Charles University in Prague – one semester in *Musicology* (winter semester 2014/2015).

Definitional Foundations for Intelligent Systems, Part I: Quality Criteria for Definitions of Intelligence

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Abstract

We posit that the lack of consensus definitions of (machine or artificial) intelligence might be affected by the lack of knowledge of conceptual analysis and other well-investigated theories. Acute contextualization of the concepts that are defined may also be an issue. Accordingly, in this two-part paper, we review some basic concepts from across research fields on how to explicate a definition. In Part I we propose 30 quality criteria for definitions that shall serve as guidelines for well-defined definitions of any concept. The quality criteria may allow for both better insights into definitions and a wider understanding of the current discourse on AI. In Part II we provide basic terminology on definitions and an iterative process to guide the construction of robust definitions by considering the quality criteria introduced in Part I. Our central goal is twofold: we want to facilitate understanding across fields and inform different stakeholders from industry, academia, legal and governments, among others, by contributing to the formal foundations on elucidating “good and robust definitions” for AI.

Keywords: Artificial Intelligence, definitions, intelligence, quality criteria

Main Conference Topic: Robotization, Engineering and Artificial Intelligence

Introduction

Artificial Intelligence (AI) is a term that has been used more loosely than defined. Moreover, intelligence is a fundamental concept that does not have a consensus definition in any of the concerned fields of study. This is true of disciplines such as Computer Science, Psychology, Education and the relevant Cognitive Science domains, to say nothing of intersecting or cross domain research fields where a consensus definition may be even more pressing. This is also true of concepts like fairness, transparency, model interpretability, privacy, and other related terminology used around intelligent systems. As a direct consequence, the lack of overarching definitions is having both positive and negative implications for the design, development, use, and regulation of those systems. If a concept is defined well, there is ground for a better understanding and further use of the concept. Yet, laypeople and concerned parties are being presented with an overwhelming variety of definitions for the same concept that propitiate more confusion than clarification.

Defining a concept might be a very complex problem. Although recent work has tried to bring clarity on defining the most important concept of the AI field (for instance, see [18]), still, there is currently no overarching definition of machine or artificial intelligence. Furthermore, other equally important concepts that are essential for AI systems remain ill-defined. This is true of the concepts of *model interpretability* [13], *fairness* [5, 27], *privacy*, *transparency*, and many others for which multiple definitions have been provided that, far from

clarify, add to a plethora of misinterpretations and misunderstandings about their nature. Whilst, in Pei Wang's words [30], "[i]t is just normal for every researcher to believe they have the best idea [on defining a concept], so we cannot expect some consensus to be achieved soon," some possible reasons for not having *convincing* definitions could be traced back to a lack of knowledge of conceptual analysis and other well-investigated theories. Acute contextualization of the concepts that are defined may also be a big issue. We want to change this unfortunate situation. If we truly want to address fundamental questions concerning the design, development, deployment, use, and even regulation of AI systems, then we need to consider definitional foundations regarding the concepts these systems deal with.

Most works on defining a definition are limited to a very general understanding of what a definition is, thereby providing basic criteria it should fulfill in a certain context, but fail to consider other criteria that might be equally (or more) relevant in other contexts, i.e., some works focus on very specific fields and shortlist some criteria but don't refer to other criteria that might be of importance. Similarly as it has been the case for engineers when writing definitions of terms [26], there is a general neglect among computer scientists in general and AI practitioners in particular of a thorough consideration of conceptual analysis for definitions of intelligence and other related terms. The common stance is either an acute contextualization of the new definition that is suggested depending on the concrete application at hand, or the diminishing of the importance to define the concept at all, two extremes that should actually be avoided, as called out by Aaron Sloman [23] more than three decades ago. More on conceptual analysis will be introduced in Part II of this paper.

It is the central goal of the authors of this paper to raise awareness of the role well-defined definitions play in the study and understanding of any concept. This should be of special interest in government, legal, and social issues that deal with intelligent systems and the consequences of their use, deployment, and regulation, for instance. In particular, basic terminology and quality criteria for definitions are addressed here, with the hope they will finally find the place they should permanently belong to: the AI and other concerned fields and audiences dedicated to the conceptualization, development, validation, evaluation, and use of systems that simulate or show any intelligent thinking or behavior. Only after a theoretical framework of intelligence is thoroughly defined and understood, well-defined definitions included, will we be able to move into the next phase: in other words, the acceptance that, and paraphrasing Raworth [21], as humanity's context, values, and aims continually evolve, so too might be the way we define AI and advance the field.¹

Our thesis is that a determining step in any attempt to understand intelligent systems better must start with defining intelligence well. After all, how can we build truly artificially intelligent machines and understand their behavior if we cannot accurately define what intelligent abilities should be considered, and how they should be implemented and measured? Furthermore, defining intelligence, especially machine or artificial intelligence, is not an exclusive task done by AI and other related practitioners anymore: it turns out that even news agencies are looking for "their" *sound* definitions of AI [2]. Unfortunately, there is no widespread agreed consensus on a definition of intelligence nor of AI.

¹ To support this, we have also created the **Defintly App**, available at <http://defintly.com> and with provisional password *agisiorg*. In its initial version, it contains most of the content presented in this two-part paper and assists users when defining concepts in any field.

Sometimes researchers and practitioners deal with concepts that have previously been defined in the literature or that are common knowledge in a certain domain. Other times they find themselves in situations where they are the ones that define new concepts. However, questions like “What is a definition?” “How should a definition be defined?” “What should be considered when defining a definition?” or “What is a *good* definition?” remain unanswered in most situations. This is the case in intelligence research in other disciplines: several definitions of intelligence have been proposed over the years, but, as indicated by Hunt and Jaeggi in [8], “*after 100 years of research, the definition of the field is still inadequate.*” Furthermore, questions such as: “What is a *good* definition of intelligence?” or “How should a definition of (machine) intelligence be defined?” are almost never examined in the scientific literature nor a systematic conceptual analysis has been performed.

We want to bridge topics from non-technical areas that have been neglected by the AI community for too long, topics that are not taught in Computer Science courses, and that AI researchers and practitioners do not consider (as they should, in our opinion) before providing a new definition of a concept, say a working definition, a dictionary definition, or of any other type. We are living in a time where defining what AI is and what it is not, for example, is becoming a crucial concern of stakeholders outside the AI community, but part of the AI community prefers to avoid that discussion. We are of the opinion this must change.

With this two-part paper we intend to give answers to these and other related questions and to help bridge diverse research fields on defining definitions. Along with previous work that analyzes cognitive biases in experts’ written opinions about definitions of intelligence [16], we also seek to understand why finding a “concordant” definition might be difficult to accomplish although not impossible. Paraphrasing Kate Raworth’s approach [21] when she calls for rethinking economics as a science, defining machine intelligence is not about finding the perfect definition,² because it does not exist yet and maybe will not; it’s about establishing a definition that reflects the context we face, the values we hold, and the aims we have in the field.

Quality Criteria for Definitions

The quality criteria that are introduced in what follows focus on the main characteristics or properties a definition should entail in order to be considered a *good* definition. The purport originates from quality criteria that are crucial for both software specifications and individual software requirements and what they should meet in order to be considered “of high quality” [22]. Those are very particular to the field of Software Engineering, but similar high-quality descriptions are desirable for definitions.

Some of the quality criteria for definitions presented in this paper were collected after an exhaustive examination of the literature on definitions. Legg and Hutter [12] and Wang [29], for example, analyze the different properties or requirements a definition of intelligence should have or fulfill. Other quality criteria are developed by the authors of this paper. And others are the result of a thorough, qualitative analysis of the responses to the AGISI research survey on defining machine intelligence [17]. Respondents were asked to rate their level of agreement with definitions of human and machine intelligence, as well as to justify their decisions. This resulted in a corpus with more than four thousands opinions or arguments for and against

² However, sloppy definitions mislead the public’s understanding and make cooperation difficult among different groups of researchers [29], this also being a topic of discussion in other fields [9].

definitions.³ Furthermore, respondents were asked to provide their suggested definitions of human and machine intelligence. Both the particular characteristics of the most agreed upon definitions from the literature and the respondents' suggested definitions were also analyzed and informed the quality criteria presented here.

The majority of the quality criteria that are listed in what follows could be applied to the definition of any term: with a few exceptions, these quality criteria are not specific to a definition of intelligence alone; they can be easily adapted to the definition of other concepts. The quality criteria are intended to serve as guidelines when defining the definition of a concept. This is why, in searching for a definition of a new concept, or when using or adapting a definition from other authors to a concrete context, it might be desirable, or even convenient, to consider the quality criteria presented here. Paraphrasing Chris Rupp [22], if one knows how a definition is to be defined from the beginning, writing a good definition becomes a more realistic goal.

Whenever possible, we provide a short explanation of what each criterion means, together with the corresponding, original literature references that may lead to more information about that criterion.⁴ Some important, last clarifications though: not all criteria are necessary nor sufficient for a definition to be well-defined. In some contexts, contradictions among criteria might arise or some of the criteria might never be satisfied at all. However, this doesn't undermine the importance of establishing sound quality measures for defining concepts. Furthermore, the fulfillment of some criteria should not be seen as a dichotomy but as a continuum, a degree of satisfaction that may depend on the context or the field, for example.

What is a Good Definition?

A *good* definition of machine, artificial, or human intelligence,⁵ in the following just *intelligence* ...

1. ... is *complete*. It defines the "*what*," the "*how*," and the "*why*," of intelligence.
2. ... defines the "*what*," the thing to be defined. It defines intelligence.
3. ... defines the "*how*," the means to reach the thing to be defined. It defines the means or the ways to reach intelligence.
4. ... defines the "*why*," the purpose of the thing to be defined. It defines the purpose of intelligence.
5. ... is *ostensive*. It includes (examples of) characteristic properties of intelligence. It exemplifies the "*what*," i.e. it exemplifies cognitive abilities or cognitive functions that indicate intelligence [7].
6. ... is *operational*. It includes (examples of) characteristic operations or processes related to intelligence. It exemplifies the "*how*," i.e. it exemplifies behavioral characteristics for reaching intelligence [7].
7. ... is *useful* [19]. It *has utility* [14], e.g. for the society, for the development of systems. It expresses *meaning* [10]. It is fruitful [29]. It exemplifies the "*why*," i.e. it exemplifies the purpose of intelligence.
8. ... is *unbiased* towards any particular culture, species, etc. [12].

³ Other details about the survey, the results obtained, and their analysis are not in the scope of this paper. We refer the interested reader to the already indicated work [17] for more.

⁴ Some quality criteria are self-explained. We don't dive into deep explanations for space reasons.

⁵ For the purposes of focusing, we refer here to the concept of intelligence for being an essential concept to AI.

9. ... is *clear*, in that it avoids metaphorical, ambiguous language [1], and obscure terms [15]. It is not defined in terms of other vague concepts [29]. It is clearly written; it is perspicuous.
10. ... is *consistent*, it includes no contradictory statements.
11. ... is *affirmative* [1].
12. ... is *easy to understand* [14]. It is *understandable* [1] by the general public [19].
13. ... is *objective*, in that it is a definition that does not include subjective opinions [12].
14. ... is *exclusive*, in that it includes nothing which is not a part of intelligence [20].
15. ... is *comprehensive*, in that it omits no essential attribute of the thing to be defined [1]; it omits nothing which is a part of intelligence [20].
16. ... is *simple* [14, 29]. It is grammatically simple [25].
17. ... is *short* (perceived and relative to other definitions). It defines the essential with fewer words as possible.
18. ... is *formal*. The definition is specified with a high degree of precision and, ideally, using formal mathematics [12].
19. ... does not repeat the name of the thing to be defined [15]. There is “*no vicious circle*” in the definition [25]. I.e. it does not repeat or uses intelligence as part of the definition to define intelligence.⁶
20. ... is *scientifically valid* [19]. It reflects *current scientific knowledge* [14].
21. ... is *original*. If googled, for instance, it does not “exist,” it is not a definition “from someone else” (unless its author explicitly indicates that it is a definition from the literature). In other words, if it exists, there is no need to re-define it the same way; it should be cited instead.
22. ... is an *intellectually elegant* definition [28], a very specially formulated one.
23. ... is *measurable* [4, 14]. It can be measured.
24. ... is *functional*, in that the wording used to state what the thing to be defined is is a function of the language in which it is stated [1, 3]. I.e. it uses the concepts and language that are common knowledge in the discipline where intelligence is defined.
25. ... is *fundamental*, in that it does not need to be changed from time to time due to changing technology and knowledge [12].
26. ... is *specific* [14] to what it is being defined.
27. ... is *general*, it can be applied “*to everything*” [12], e.g. it does not distinguish between machine, artificial, or human intelligence.
28. ... is *widely accepted* in the discipline [6].
29. ... has a *universal* application [1], in that it is not anthropocentric [12] unless its goal is to define human intelligence explicitly.
30. ... defines intelligence “*as a field.*”

As stated above, not all these quality criteria are necessary nor sufficient; such a distinction should be considered and is not addressed in this paper. For example, that a definition should be *intellectually elegant* could be thought of as secondary in importance. However, intellectually elegant definitions shape the common imagination like no others. Why not aim at an appealing, elegantly written way of using the language to define a concept?

Any importance, or priority, or ranking of some criteria over others is not addressed here either, for space reasons. Determining their necessity or sufficiency could help. It is probably better to reflect on these aspects once the context, where the definition of the concept should

⁶ In the case of the concept of intelligence, though, it could be very difficult to define it without generating definitional circles [24].

be applied, is specified. As one respondent writes in her feedback after answering the questions from the survey on defining intelligence introduced above, “any definition of [artificial intelligence] is necessarily contextual.” We believe that assessing the quality of a definition is better done when, ideally, the “what,” the “how,” and the “why” of a definition (see criteria 1 to 4 above) are clear for a particular context. The 30 quality criteria for definitions could guide the process of searching for a definition in any context.

Some of the quality criteria refer to characteristics or properties that have a common origin. They could be grouped into more general categories. For example, there are quality criteria that refer to grammatical aspects of a definition; others, to their meaning or value. Figure 1 shows a possible hierarchy containing five main categories and their relationships that group the first 29 quality criteria introduced above.

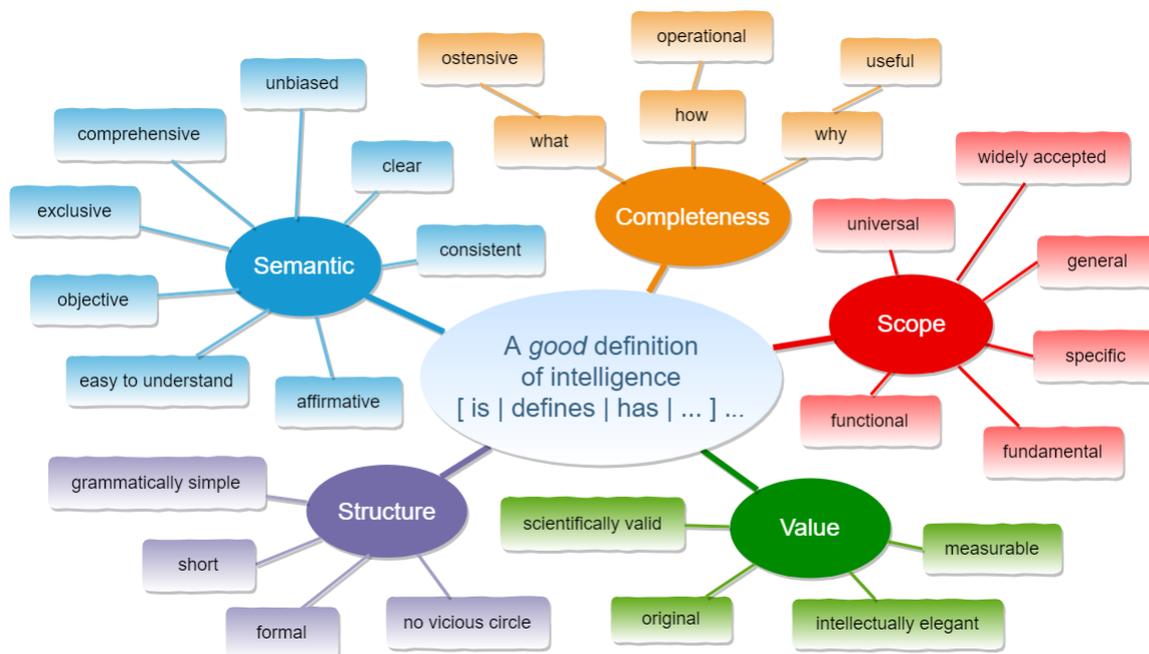


Figure 1: Quality criteria for definitions of intelligence grouped into five main categories

Other categorizations might be more convenient depending on the concrete application or context at hand. A single quality criterion could belong to more than one category, as is the case of a definition being *formal* (see the category *Structure* in Figure 1). This quality criterion could also be grouped under the general category *Semantic*, when neither the form nor the structure of the definition is meant but that is formal for example with respect to the mathematical language that is used. This might be the case of different formal definitions for the concept of fairness, for instance.

Conclusion

Part I of this paper presented 30 quality criteria for definitions. The list encompasses different properties that are desirable for a definition to be considered of high quality or well-defined. The proposed list of quality criteria is not exhaustive. Yet it should serve as a basis for defining and evaluating definitions of concepts that can support academics and practitioners in their work.

Quality criteria for definitions allow for a better comparison between definitions. For example, well-defined definitions of a concept could assist in the creation of tests that measure

that concept, help to reach a common understanding about what it means, and, hopefully, avoid propagating false and misleading information about its relations to other concepts and how do artificial systems consider it when interacting with humans. It all starts by understanding the appropriate meaning of the concept and, for doing that, well-defined definitions are essential.

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Definitional Foundations for Intelligent Systems, Part II: Constructing a Definition and Examples

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Abstract

We posit that the lack of consensus definitions of (machine or artificial) intelligence might be affected by the lack of knowledge of conceptual analysis and other well-investigated theories. Acute contextualization of the concepts that are defined may also be an issue. Accordingly, in this two-part paper, we review some basic concepts from across research fields on how to explicate a definition. In Part I we propose 30 quality criteria for definitions that shall serve as guidelines for well-defined definitions of any concept. The quality criteria may allow for both better insights into definitions and a wider understanding of the current discourse on AI. In Part II we provide basic terminology on definitions and an iterative process to guide the construction of robust definitions by considering the quality criteria introduced in Part I. Our central goal is twofold: we want to facilitate understanding across fields and inform different stakeholders from industry, academia, legal and governments, among others, by contributing to the formal foundations on elucidating “good and robust definitions” for AI.

Keywords: Artificial Intelligence, definitions, intelligence, quality criteria

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Introduction

Well-defined definitions are essential in any field. They are seen as a condition for progress [6], help to guide research [15, 21], and show the way towards a clear target [4] or goal of the field. However, established theories and practices that deal with the definition of concepts are rarely considered by most practitioners. For example, a thorough conceptual analysis of intelligence or of the concepts intelligence is based or depends on, has been unfortunately missing in the AI community. Kelley in *The Art of Reasoning* [10] suggests that a definition and the concept we define through it should provide a *neutral* framework for thought and discussion “so that people on opposite sides of an issue can rely on a common understanding of the relevant concepts in presenting their arguments and thus understand each other.” Consequently, he states that “it is not a good idea to include controversial information in a definition.” This is not the only desired property of a good definition, though. Several other desirable properties or quality criteria for definitions were introduced in Part I of this paper. There, we also introduced the problem of not having an overarching definitions of artificial intelligence (AI) and why this has been a stumbling block in the development of the AI field. In Part II, we introduce basic terminology on definitions as well as an iterative process for constructing a definition. We also provide examples to clarify some of the quality criteria introduced in Part I of the paper.

Basic Terminology on Definitions

In this section we first introduce the basic terminology on definitions, like the constituents of a definition, its types and purpose, among other related subjects. The section's aim is to raise awareness of the importance of these subjects, long overlooked by most stakeholders although essential to the definitional foundations of any field.

What is a Definition?

A definition “states a thing’s essence,” it “expresses the nature of a thing and its substance.” These were Aristotle’s words in his *Posterior Analytics* [1] written in 350 B.C.E. Since then, a myriad of definitions of what a definition is has been proposed, but almost all of them converge to the same idea: the purpose of a definition is to state, express, explain, or specify what a *thing* is. According to the Cambridge Dictionary, a definition is not only “a statement that explains the meaning of a word or phrase,” i.e. its essence, its substance, but also “a description of the features and limits of something,” i.e. its characteristics and scope. Definitions can be defined by expressing the meaning of the thing to be defined in very different ways: there are definitions that do it by using other constructs where the meaning is known; these are the *lexical definitions* when concepts from a lexicon or dictionary are used. *Ostensive definitions* exemplify things to which the expression applies because examples are pointed out. And *stipulative definitions* express the meaning by proposing how the language should be used. These three broad categories, lexical, ostensive, and stipulative definitions, have received different designations with time and have been subdivided into further subcategories.

How Should a Definition be Defined?

Definitions enable people to understand a concept or theory; thus, providing conceptual clarity on how definitions should be defined is, although mostly overlooked, an essential activity prior to the use of the concept or theory. According to Cassidy [3] after his analysis of several Aristotelian works on definitions, a concept may have many definitions and how it is defined “is a function of the language in which it is stated,” i.e. “the way we talk about things is a function of the things we talk about.” Furthermore, a definition is a “verbal formulae of selectively grouped data taken from the knower’s experience” [3]. Hence, there is no unique way of defining a concept, definitions may be inherently contextual, and they would depend on both the people that define them and their area of knowledge.

A definition should have the form of “an equivalence” [20], of “a two-part equivalence” [18], which on the one hand contains the thing to be defined, the *definiendum*, and on the other hand the expression that defines it, the *definiens*. Ideally, the *definiens* follows the *definiendum* in order of appearance and both are constructed in such a way that certain *Rules of Definitions* [10, 20] are fulfilled. The *definiendum*, for example, should be a short, grammatically simple expression that specifies the concept that is being defined. Similarly, the *definiens* should fulfill certain rules that guarantee, for example, that the concepts used in its expression have a meaning that is previously known or that has already been defined: “[i]t may be a sentential function of an arbitrary structure, but containing only those constants whose meaning is understood; that is, the meaning of each of those constants either is immediately obvious or has already been explained” [20]. Furthermore, it should not be too broad or too narrow, circular, nor use negative terms unnecessarily, ambiguity or vagueness, nor obscure or metaphorical language [10].

In his empirical work on Logic, Mercier [14] states that to define “is to say what a thing is.” One way of stating the meaning of the *definiendum* is by referring to its *genus* and

differentia as part of the *definiens*, like in Aristotelian definitions. The *genus* or kind is the broader category the *definiendum* belongs to. For example, in Gottfredson's definition "Intelligence is a very general mental capability that [...] involves the ability to reason, plan, solve problems, think abstractly, comprehend complex ideas, learn quickly and learn from experience" [7], mental capability is the *genus* of intelligence, i.e. the broader concept. The *differentia*, however, distinguishes the concept from other *definienda*, in that it specifies the properties or characteristics that differentiate the *definiendum* from other concepts from the same *genus*, as it is expressed in the rest of Gottfredson's example.

A definition could have different functions and be "relative to various purposes" [22]. It can clarify the boundaries of a concept, the relationships among concepts, and it can also provide a summary statement about the referents of a concept, i.e. it can highlight its essence [1, 10]. According to Kelley [10], "[a] good definition condenses the knowledge we have about the referents of a concept, giving us just the highlights, the key points, the essence."

Conceptual Analysis

One of the main activities philosophers deal with is conceptual analysis. As pointed out by Aaron Sloman [19], conceptual analysis is "required for improving our understanding not of the physical world itself, but of how people of various ages and cultures think about the world." On the other hand, our understanding of the world builds on certain assumptions without it would not be possible to construct or define most common concepts we know [5]. When we define a concept, we fix it, we isolate it from the rest [22], thus how we define it matters. According to [13], conceptual analysis "specifies a set of conditions that are individually necessary and jointly sufficient for the application of [a] concept." As such, conceptual analysis encompasses a series of strategies and methods that seek to analyze and describe concepts, phenomena, and theories. Some of these strategies are extensively detailed in [19] and summarized in what follows. They may be a necessary step that must be considered before constructing a definition of a concept, in parallel to the process of defining it, or even after doing that, for instance when a definition must be refined or improved to cope with advances in a particular field of study. Some strategies presented in [19] for analyzing a given concept are:¹

- Collecting descriptions of both varied instances and non-instances of the concept, and comparing them. This would help to clarify the specificity with which the concept is or should be defined.
- Criticizing and extending already existent definitions, e.g. definitions given in dictionaries or by other practitioners in the field. A thorough revision of the literature should avoid unnecessary re-definitions of an already defined terminology.
- Collecting examples of the concept and related words that may illustrate one concept but not the others; also collecting examples of their use and how to *teach* the concept to other people. This might help to understand the concept and its definition by others, as it will be discussed later in this paper.
- Asking what the role of the concept is in a given culture or context, which should its purpose be, whether it would guide research in a given field and how. This could determine the type of the definition and the way it is constructed.

¹ We refer the reader to the cited work for a detailed description of these and other strategies.

- Listing ways in which the truth or falsity of statements involving the concept in question can be tested. This may allow for the conceptual clarity to which a good definition ought to contribute.

How to Construct a Good Definition?

The Rules of Definitions [10, 20] introduced above consider a set of properties that a definition should meet in order to be considered a good definition. Kelley [10] argues, for example, that if a definition includes a *genus* and a *differentia* that are both not too broad and not too narrow, and that state the essential attributes of the concept referents, then it is quite probable that it will also satisfy other rules from the set he proposes which is comprised by six rules altogether. One way of searching for such a combination of *genus* and *differentia*, which is the classic way to define a concept, is by following Plato's method of definition known as *Diairesis* or method of division, developed in [17] and later refined by Aristotle in his *Posterior Analytics* [1]. The idea is that a definition should include all essential elements that make it both exclusive and comprehensive (see quality criteria 14 and 15 from the list presented in Part I of this paper) by successively considering the similarities and distinctive properties of these elements with regard to other instances of the same category, thereby avoiding both the omission of important characteristics and the inclusion of others that are not essential to the definition. This way of constructing a definition is consistent with the first three rules of definitions presented in [10] and commented at the beginning of this section. However, they are not the only criteria that are desirable for having a good definition, as we have already discussed in Part I of this paper. In addition to this, there is no unique way of defining a concept (see a compendium in [5]). We suggest to construct a definition as part of an iterative process. The one presented in what follows extends the process presented in [10], in that many more quality criteria are included and a few of them are strengthened after considering the results discussed here and in [16]. Our iterative process is depicted in Figure 1. Such an iterative process could be preceded by a systematic conceptual analysis as suggested in section about conceptual analysis. It consists of the following steps:²

- (i) Use a two-part equivalence to set the form of the definition: define the *definiendum* as short and simple as possible (for example, start the definition with "*Intelligence is ...*"). Define the *definiens* with a *genus-differentia* expression that states the "what," the "how," and the "why" of the concept that is being defined (see quality criteria 1 to 4 from Part I of this paper) as short and simple as possible. In particular, once the *genus* or broader category is found, "*choose a differentia that distinguishes [the concept] from other concepts in the same genus [i.e. which is the genus of transparency and which other concepts belong to the same category?]. If there is more than one distinguishing attribute, choose the most essential one,*" as suggested in [10], because it would be easier to explain what makes that attribute special, distinguishable from the rest. A previous conceptual analysis may shed light in this endeavor.
- (ii) State the *differentia* in an ostensive way (see the section on basic terminology, as well as quality criterion number 5 from Part I of this paper). For example, when defining the concept of *human agency*, include capabilities or functions that indicate *agency* (i.e. exemplify the "what" in order to understand it better). Do not make the definition too ostensive nor too narrow, however.

² The **Defintly App**, available at <http://defintly.com> and with provisional password *agisiorg*, contains most of the content presented in this two-part paper and assists users when defining concepts in any field.

- (iii) Go through the list of quality criteria for definitions (see Part I of this paper) and evaluate whether each of them fits the *functions* of the definition (see section on basic terminology above) and in which context and extent.
- (iv) Add (resp. remove) content to (resp. from) the *definiens* to meet the quality criteria. Seek for simplicity but sought for as many fulfilled quality criteria as possible.
- (v) Adapt the wording and remove unnecessary expressions.
- (vi) Iterate the steps i) to v) as long as it is needed. In particular, take a look at the language and use it *elegantly*, thereby ensuring that the already-met quality criteria are still fulfilled, i.e. that they are not violated by occasionally changing the language.
- (vii) Stop the process when no more improvements are necessary.

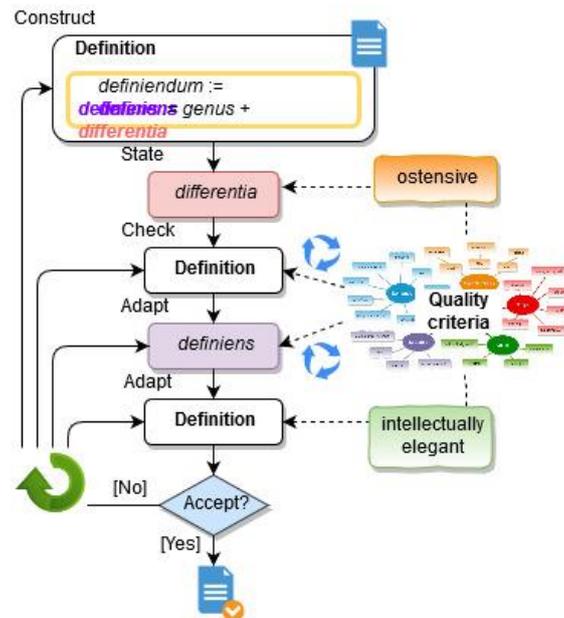


Figure 1: Iterative process to construct a definition

Constructing a definition that satisfies all quality criteria might not be possible. Even keeping all of them in mind when following the iterative process might not be straightforward at the beginning. With time and practice, however, it would be more intuitive and simpler to define concepts that follow these principles. The advantages in doing so would be considerably positive. Each and every person involved would benefit from a well-defined definition: not only the author(s) of the definition but also the reader(s) and people that use it. Hence, both the community and the scientific discourse would profit likewise and advance further, because it would be easier to discard less expressive definitions and, thus, easier to reach consensus.

Examples

The only purpose of this section is to exemplify *which* quality criteria from the list presented in Part I of this paper are met or not by a definition. It is not in the scope of this paper to construct a new definition of intelligence, since it would require at least an added, extensive analysis of the several already existent definitions of intelligence from the literature (refer to [11] for a compendium) as already discussed in the section on conceptual analysis. Instead, a selection of examples of new, suggested definitions from the survey presented in [16] are presented below. Their most relevant characteristics are analyzed and discussed.

- “Intelligence is the ability to do the right thing at the right time given a dynamic environment (that is, a shifting landscape of ‘right times’ requiring more ‘right things’).”

[Artificial Intelligence] is intelligence constructed deliberately as an artefact of a culture.” — Joanna Bryson, University of Bath and University of Princeton

Bryson’s definition defines the “what” of the definition and it makes an explicit distinction between human and artificial intelligence. It is not ostensive (i.e. it doesn’t include examples), but it could be considered operational since it exemplifies “how” to reach intelligence, i.e. by “[*doing*] the right thing.” This definition is short, affirmative, and general. If separated from the whole, the second part of the definition would contain a vicious circle.

- *“To my mind, intelligence (whether we’re speaking of a human or a machine) is the ability to put one’s finger on the essence of situations that one faces, and to do so reasonably rapidly. Or a bit more verbosely, ... ‘intelligence is the art of rapid and reliable gist-finding, crux-spotting, bull’s-eye hitting, nub-striking, essence-pinpointing. It is the art of, when one is facing a new situation, swiftly and surely homing in on an insightful precedent (or family of precedents) stored in the recesses of one’s memory. That, no more and no less, is what it means to isolate the crux of a new situation. And this is nothing but the ability to find close analogues, which is to say, the ability to come up with strong and useful analogies.’”* — Douglas Hofstadter, Indiana University, also citing [9]

Hofstadter’s definition defines the “what” and is ostensive: it exemplifies cognitive abilities that indicate intelligence. It also defines the “how” and includes examples of behavioral functions to reach intelligence, thus it is operational. It is not a short definition, but it is affirmative, comprehensive, and useful. Furthermore, it is an intellectually elegant definition. However, it might not be a clear definition for some audiences. Finally, let’s analyze some definitions from the literature:

- *“Intelligence is a very general mental capability that, among other things, involves the ability to reason, plan, solve problems, think abstractly, comprehend complex ideas, learn quickly and learn from experience. It is not merely book learning, a narrow academic skill, or test-taking smarts. Rather it reflects a broader and deeper capability for comprehending our surroundings -- ‘catching on,’ ‘making sense’ of things, or ‘figuring out’ what to do.”* [7]

Gottfredson’s definition, which was already used as an example in the section on basic terminology above, was the most agreed upon definition of intelligence in [16]. Of the 567 people that participated in the survey,³ a total of 356 respondents agreed (38.1%) or strongly agreed (24.7%) with this definition, representing about two-thirds of positive agreement. It is also a widely accepted definition among experts in intelligence and allied fields [8], such as neuroscientists and psychologists. Linda Gottfredson is a psychologist. It should be mentioned that more than 70% of all participants in the survey are computer scientists, engineers, mathematicians, and physicists. Is Gottfredson’s definition a *good* definition of intelligence? One of its most distinguishing characteristics is that it exemplifies several cognitive abilities when defining the “what,” i.e. when defining intelligence. In fact, it was the most ostensive definition from the survey, which presented a total of 18 definitions of intelligence from the literature to agree upon. It can be verified that it fulfills almost all 30 but three quality criteria (no. 17, 18, and 30). This is very interesting since other definitions explicitly avoid the

³ The AGISI survey was closed in July 2019. The results included here are considered to be final. Partial results are presented in [16].

specification or exemplification of capabilities and are therefore considered more abstract and general by their authors, thus better for defining intelligence. That is the case of Legg and Hutter's definition of machine intelligence [12]: "*Intelligence measures an agent's ability to achieve goals in a wide range of environments.*" The authors analyze several examples of definitions in detail and claim that intelligence is the effect of capacities and not the result of having a set of them. Legg and Hutter mostly refer to semantic aspects, i.e. to which extent and how the analyzed definitions define intelligence or not, thereby justifying why their own proposed definition of intelligence might be more appropriate. Furthermore, they argue that it is very difficult to specify the capacities that might be needed and that they would depend on the concrete context at hand. It seems contextual definitions are too specific for some authors. However, ostensive definitions are more preferred by researchers and practitioners: Legg and Hutter's definition had only a 48.7% of total positive agreement from the respondents to the survey (276 respondents agreed (37.4%) or strongly agreed (11.3%) with that definition) and it was ranked fourth place overall. Other definitions, Gottfredson's included, were much more favorably ranked by respondents. A commonality is that they are ostensive.

If we look back at the examples presented in this section, not all of them follow the Aristotelian construct. Moreover, not only one *genus* but different *genera* were used by the authors to define the broader category intelligence may belong to. Which of them is the most appropriate level of abstraction might be in itself a very controversial topic. Ideally, a good definition satisfies many of the 30 quality criteria for definitions presented in Part I of this paper.

Conclusion

Part II of this paper introduced definitional foundations for definitions. These included a process for constructing good definitions of concepts, from scratch, in particular, the concept of intelligence. Examples were also provided to illustrate some of the quality criteria that were introduced in Part I. We do not recommend a technical perspective for the analysis of these topics; our wish would be the AI community being more knowledgeable about what other non-technical disciplines have considered so far. A similar analysis as the one presented here for the concept of intelligence could be applied to the definition of those concepts that are having a crucial role in establishing the guidelines and foundations for AI. We hope our work can contribute to informing different stakeholders from industry, academia, legal and governments, among others, on how to do such an analysis.

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We would like to thank Aaron Sloman for his enlightening suggestions about conceptual analysis and its relation to definitions.

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Brief biographies of the authors

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Employees' entrepreneurial orientation and organisational commitment: What are their relationships to individual workplace performance?

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Purpose – The purpose of this paper is to analyse the mediating role of organisational commitment (OC) in the relationship between employees' entrepreneurial orientation (EEO) and individual workplace performance (IWP).

Design/methodology/approach – This study examines the constructs of employees' entrepreneurial orientation (EEO) and organisational commitment (OC), their impact on individual workplace performance, and whether the results are related to employee's job seniority. The research is aimed at determining the role of EEO and OC in explaining differences in individual workplace performance. The set of research proposals identifies (1) how employees' entrepreneurial orientation and organisational commitment are related to each another, (2) whether the relationship between employees' entrepreneurial orientation and individual workplace performance is mediated by organisational commitment and (3) whether organizational commitment and individual workplace performance increase with employees' job seniority growth? The conceptual framework for this research was a theory of the social exchange as well as the organizational citizenship and extra-role behavior theories. The method used for carrying out empirical research was CAWI (Computer Assisted Web Interviews). The effective research sample included 926 employees hired in two enterprises (478 employees in an IT sector enterprise and 448 employees in an electro-energy sector enterprise). The project was funded by The National Science Centre in Poland allocated on the basis of a decision DEC-2014/15/B/HS4/04326.

Findings – The paper presents arguments that allow for recognising employee EO as a determinant of individual workplace performance. In addition, it has been proven that the employees' job seniority is not a significant predictor of individual workplace performance.

Research limitations/implications – The research findings do not take the notice of how employees' entrepreneurial orientation and organisational commitment can be manifested at levels of analysis other than that of the individual one (e.g. team level). Therefore, the next direction of further analysis should involve the aggregation of individual results (of team members) to the team level, because the empirical evidence on how entrepreneurial orientation and organisational commitment work, may improve the performance of the whole team.

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